



# AFCTN Test Report 94-047

AFCTB-ID  
93-098



## Technical Publication Transfer

using:



ArborText's Data

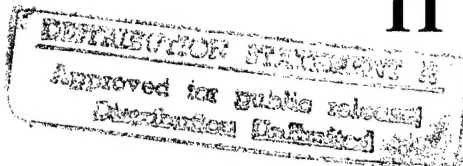


MIL-D-28000A (IGES)  
MIL-M-28001A (SGML)  
MIL-M-28002A (Raster)  
MIL-D-28003 (CGM)



## Quick Short Test Report

11 October 1993



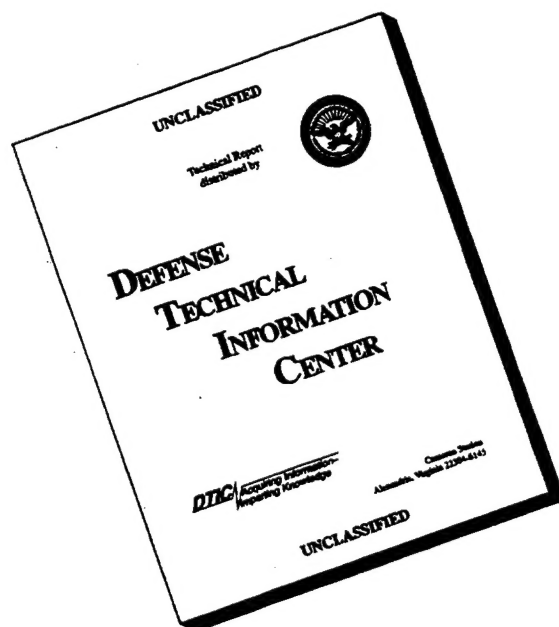
19960822 178



Prepared for  
Electronics Systems Center  
Det 2 HQ ESC/AV-2  
4027 Colonel Glenn Hwy, Suite 300  
Dayton, Ohio 45431-1672

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**Technical Publication Transfer**

**Using:**  
**ArborText's Data**

**MIL-D-28000A (IGES)**  
**MIL-M-28001A (SGML)**  
**MIL-R-28002A (Raster)**  
**MIL-D-28003 (CGM)**

**Quick Short Test Report**

**11 October 1993**

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## Contents

1.	Introduction.....	1
1.1.	Background.....	1
1.2.	Purpose.....	2
2.	Test Parameters.....	3
3.	1840A Analysis.....	6
3.1.	External Packaging.....	6
3.2.	Transmission Envelope.....	6
3.2.1.	Tape Formats.....	6
3.2.2.	Declaration and Header Fields.....	7
4.	IGES Analysis.....	7
5.	SGML Analysis.....	8
6.	Raster Analysis.....	9
7.	CGM Analysis.....	10
8.	Conclusions and Recommendations.....	12
9.	Appendix A - Tapetool Report Logs.....	13
9.1.	Tape Catalog.....	13
9.2.	Tape Evaluation Log.....	15
9.3.	Tape File Set Validation Log.....	17
10.	Appendix B - Detailed IGES Analysis.....	19
10.1.	File D001Q008.....	19
10.1.1.	Parser/Verifier Log.....	19
10.1.2.	Parser Log - AutoCAD R12.....	23

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10.1.3. Output IGESWorks.....	28
11. Appendix C - Detailed SGML Analysis.....	29
11.1. DataLogic Parser Log.....	29
11.1.1. DTD Parser Log.....	29
11.2. Exoterica validator exl Parser.....	30
11.3. Public Domain sgmls Log.....	31
11.3.1. DTD Report.....	31
11.3.2. Text Parser Log.....	31
12. Appendix D - Detailed Raster Analysis.....	32
12.1. File D001R004.....	32
12.1.1. Output g42tiff/IslandPaint.....	32
12.2. File D001R005.....	33
12.2.1. Output IGESView.....	33
12.3. File D001R009.....	34
12.3.1. Output g42tiff/IslandPaint.....	34
13. Appendix E - Detailed CGM Analysis.....	35
13.1. File D001C006.....	35
13.1.1. Parser Log MetaCheck.....	35
13.1.2. validcgm Log.....	36
13.1.3. Output Harvard Graphics.....	38
13.2. File D001C007.....	39
13.2.1. Parser Log MetaCheck.....	39
13.2.2. validcgm Log.....	40
13.2.3. Designer.....	42

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13.3. File D001C010.....	43
13.3.1. Parser Log MetaCheck.....	43
13.3.2. validcgm Log.....	44
13.3.3. Output Freelance.....	46
14. APPENDIX F - Complete Document.....	47

## 1. Introduction

### 1.1 Background

The Department of Defense (DoD) Air Force Continuous Acquisition and Life-cycle Support (CALS) Test Network (AFCTN) is conducting tests of the military standard for the Automated Interchange of Technical Information, MIL-STD-1840A, and its companion suite of military specifications. The AFCTN is a DoD sponsored confederation of voluntary participants from industry and government managed by the Electronic Systems Center (ESC).

The primary objective of the AFCTN is to evaluate the effectiveness of the CALS standards for technical data interchange and to demonstrate the technical capabilities and operational suitability of those standards. Two general categories of tests are performed to evaluate the standards; formal and informal.

Formal tests are large and comprehensive, which follow a written test plan, require specific authorization from the DoD, and may take months to prepare, execute, and report.

Informal tests are quick and short, used by the AFCTN technical staff, to broaden the testing base. They include representative samples of the many systems and applications used by AFCTN participants. They also allow the AFCTN staff to gain feedback from many industry and government interpretations of the standards, to increase the base of participation in the CALS initiative, and respond to the many requests for help that come from participants. Participants take part voluntarily, benefit by receiving an evaluation of their latest implementation (interpretation) of the standards, interact with the AFCTN technical staff, gain experience using the standards, and develop increased confidence in them. The results of informal tests are reported in Quick Short Test Reports (QSTRs) that briefly summarize the standard(s) tested, the hardware and software used, the nature of the test, and the results.



## 1.2 Purpose

The purpose of the informal test, reported in this QSTR, was to analyze ArborText's interpretation and use of the CALS standards in transferring technical publication data. ArborText used its CALS Technical Data Interchange System to produce data, in accordance with the standards, and delivered it to the AFCTN technical staff on a 9-track magnetic tape. This test is part of the AFCTB SGML transfer demonstration.

## 2. Test Parameters

Test Plan: AFCTB 93-098

Date of  
Evaluation: 11 October 1993

Evaluator: George Elwood  
Air Force CALS Test Bed  
Det 2 HQ ESC/AV-2P  
4027 Colonel Glenn Hwy  
Suite 300  
Dayton OH 45431-1672

Data  
Originator: Joseph Connolly  
ArborText Inc.  
1000 Victor Way, Suite 400  
Ann Arbor MI 48108  
(313) 996-3566

Data  
Description: Technical Manual Test  
1 Document Declaration file  
1 Document Type Definition (DTD)  
1 Initial Graphics Exchange Specification  
(IGES) file  
1 Text/Standard Generalized Markup Language  
(SGML) file  
3 Raster files  
3 Computer Graphics Metafile (CGM) files

Data  
Source System:

1840

**HARDWARE**

Sun 4/20

**SOFTWARE**

ArborText Adept 5.0

IGES

**HARDWARE**

Sun 4/20

**SOFTWARE**

ArborText draw2iges

Text/SGML

**HARDWARE**

Sun 4/20

**SOFTWARE**

ArborText Adept

Raster

**HARDWARE**

Sun 4/20

**SOFTWARE**

ArborText tiff2gp4

CGM

**HARDWARE**

Sun 4/20

**SOFTWARE**

ArborText draw2cgm

**Evaluation Tools Used:**

**MIL-STD-1840A (TAPE)**

SUN 3/280

AFCTN Tapetool v1.2.10 UNIX

XSoft CAPS/CALS v40.4

PC 486/50

AFCTN Tapetool v1.2.10 DOS

**MIL-D-28000 (IGES)**

Sun SparcStation 2

AUTODESK AutoCAD R12

ArborText iges2draw

Carberry CADLeaf Plus 3.1

IGES Data Analysis (IDA) Parser/Verifier v92

IDA IGESView v3.05

International TechneGroup Incorporated

(ITI) IGES/Works v1.3

Rosetta Technologies Prepare

Rosetta Technologies Preview v3.2

PC 486/50

AUTODESK AutoCAD 386 R12

Cadkey Cadkey v6.0

IDA IGESView Windows

Rosetta Technologies Prepare

Rosetta Technologies Preview

**MIL-M-28001 (SGML)**

SUN SparcStation 2

ArborText ADEPT v4.2.1

PC 486/50

Exoterica XGMLNormalizer v1.2e3.2

Exoterica Validator v2.0 ex1

McAfee & McAdam Sema Mark-it v2.3

Public Domain sgmls

**MIL-R-28002 (Raster)**

SUN SparcStation 2

ArborText g42tiff

Carberry CADLeaf Plus 3.1

AFCTN validg4

AFCTN xrastb.sun4

IDA IGESView v3.0

Island Graphics IslandPaint v3.0

PC 486/50

AFCTN validg4

IDA IGESView Windows

Inset Systems HiJaak Window v1.0

Expert Graphics RxHighlight v1.0

**MIL-D-28003 (CGM)**

SUN SparcStation 2

ArborText cgm2draw

Island Graphics IslandDraw 3.0

Carberry CADLeaf Plus 3.1

PC 486/50

Advance Technology Center

(ATC) MetaView R 1.12

ATC MetaCheck R 2.10

Software Publishing Corporation

(SPC) Harvard Graphics v3.05

Inset Systems HiJaak v1.0 Windows Pro

Lotus Freelance v2.01

Micrografx Designer v3.1

**Standards**

**Tested:**

MIL-STD-1840A

MIL-D-28000A

MIL-M-28001A

MIL-R-28002A

MIL-D-28003

### **3. 1840A Analysis**

#### **3.1 External Packaging**

The tape arrived at the Air Force CALS Test Bed (AFCTB) enclosed in a commercial mailing envelop. The exterior of the envelop was not marked with a magnetic tape warning label, as required by MIL-STD-1840A, para. 5.3.1.3.

The tape was not enclosed in a barrier bag or barrier sheet material as required by MIL-STD-1840A, para. 5.3.1.2. The tape reel was missing the label indicating the recording density, as required by MIL-STD-1840A, para. 5.3.1. Some 9-track tape units require this BPI to be set manually. A packing list showing all files recorded on the tape was not enclosed in the box.

While ArborText did not meet the requirements defined in MIL-STD-1840A for the delivery to the AFCTB, they did use available packaging for the exchange with the next participant in the demonstration.

#### **3.2 Transmission Envelope**

The 9-track tape received by the AFCTB contained MIL-STD-1840A files. The files were named per the standard conventions.

##### **3.2.1 Tape Formats**

The tape was run through the AFCTN *Tapetool v1.2.10* utility. No errors were encountered while evaluating the contents of the tape labels.

The tape was read using the XSoft *CAPS read1840A* utility without any reported errors.

The physical structure of the tape meets the CALS MIL-STD-1840A requirements.

### 3.2.2 Declaration and Header Fields

No errors were found in the Document Declaration file or data file headers. This portion of the tape meets the requirements defined in MIL-STD-1840A.

## 4. IGES Analysis

The tape contained one IGES file. This file was evaluated using IDA's *parser/verifier* set for CALS Class I. This utility reported no error in the file.

The Start Section was checked for the required compliance statement defined in MIL-D-28000A, para. 3.2.1.3.1. Although there was a statement in this area, it did not contain all of the information required by MIL-D-28000A. The statement did meet the requirements defined in MIL-D-28000.

The AFCTB has several tools for viewing IGES files. These tools are not used to generate a pass/fail but to report how commercially available software can handle the files. Many of these products are used in the development of technical publications and are good indicators of usability. The use of these products is not an endorsement nor an indication of CALS capability. All operations were performed using the default settings.

The file was converted using ArborText's *iges2draw* utility with no reported errors. The resulting file was read into Island Graphics' *IslandDraw* and displayed without a reported error.

The file was read using AUTODESK's AutoCAD R12 with translator version 5.1. No errors were reported and the file displayed correctly on the screen.

The file was converted using Cadkey's *ig2c* utility. The resulting file was read into Cadkey's *Cadkey v6.0* and displayed without a problem. The resulting image appeared to be correct.

The file was read into Carberry's *CADLeaf* software without a reported error. The resulting image appeared to be correct.

The file was read using IDA's *IGESView* and *IGESView for Windows*. No errors were reported and no discrepancies were noted in the displayed images.

The file was read using ITI's *IGESWorks* without a reported error. The file was displayed and no discrepancies were noted on the displayed image.

The IGES file was converted using Rosetta Technologies' *Prepare* without a reported error. The resulting file was read into Rosetta Technologies' *Preview* and displayed. No discrepancies were noted in the displayed image.

The IGES file meets the CALS MIL-D-28000A specification for Class I files, with the exception of the missing compliance statement which did meet the specification defined in CALS MIL-D-28000.

## 5. SGML Analysis

The AFCTB has several parsers available for evaluating submitted DTD and Text files. These tools are not used to generate a pass/fail but to report how commercially available software can handle the files. These products are used in the development of technical publications and are good indicators of usability. The use of these products is not an endorsement nor an indication of CALS capability. All operations were performed using the default settings unless specified in the report. Changes to DTD or Text files required by each system are not documented in the report.

The Text and DTD files were evaluated using the Exoterica *Validator exl* parser. No errors were reported during this procedure.

The Text and DTD files were tested using the Exoterica *XGMLNormalizer* parser with no reported errors.

The Text and DTD files evaluated using McAfee & McAdam' *Sema Mark-it* parser with no reported errors.

The Text and DTD files were evaluated using the Public Domain *sgmls* parser. No errors were reported.

The Text file was imported into ArborText's Adept software and published. A copy of the document is included in the Appendix of this report.

The SGML files meet the CALS MIL-M-28001A specification.

## 6. Raster Analysis

The tape contained three Raster files. All three files were evaluated using the AFCTN *validg4* utility. This program reported that all files meet the CALS MIL-R-28002A specification.

The files were read into the AFCTN *xrastb.sun4* viewing utility. No problems were noted.

The AFCTB has several tools for viewing Raster files. These tools are not used to generate a pass/fail but to report how commercially available software can handle the files. Many of these products are used in the development of technical publications and are good indicators of usability. The use of these products is not an endorsement nor an indication of CALS capability. All operations were performed using the default settings.

The files were converted using ArborText's *g42tiff* utility without a reported error. The resulting files were read into Island Graphics' *IslandPaint* and displayed.

The Raster files were read into Carberry's *CADLeaf* software without a reported error and displayed.

The files were read into IDA's *IGESView* and *IGESView for Windows* without a reported error and displayed.

The files were read into Inset Systems' *HiJaak for Windows* and displayed without a reported error.

The Raster files were converted using Rosetta Technologies' *Prepare* without a reported error. The resulting files were read into Rosetta Technologies' *Preview* and displayed.

The Raster files were viewed using Expert Graphics' *RxHigh-light* without a reported error.

The Raster files meet the CALS MIL-R-28002A specification.

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## 7. CGM Analysis

The tape contained three CGM files. The files were evaluated using ATC's *MetaCheck* with CALS options. This utility reported no basic CGM nor CALS errors.

The CGM files were evaluated using the beta AFCTN *validcgm* utility. This utility reported some errors.

The AFCTB has several tools for viewing CGM files. These tools are not used to generate a pass/fail but to report how commercially available software can handle the files. Many of these products are used in the development of technical publications and are good indicators of usability. The use of these products is not an endorsement nor an indication of CALS capability. All operations were performed using the default settings.

The CGM files were converted using ArborText's *cgm2draw* utility without a reported error. The resulting files were read into Island Graphics' *IslandDraw* and displayed without a problem.

The files were viewed using ATC's *MetaView* software. File D001C007 had a reported error and the image displayed with noted font errors.

The files were read into Carberry's *CADLeaf* software and displayed with no reported problems.

The files were read into Inset Systems' *HiJaak for Windows* without a reported error. However, nothing displayed on the screen. The displayed area was completely black. Attempts to change the background color did not generate any usable images.

The files were imported directly into Island Graphics' *IslandDraw* without a reported error. Background color problems were noted. All three files required a change in the background color before all parts of the images would display.

The files were imported into Lotus' *Freelance* without a reported error. The images displayed without a problem. The background color problem was not noted in this software.

The files were imported into the Micrografx *Designer* without a reported error. No problems were encountered with the background color, but some text overflow was noted in file D001C007.

According to Michael Harrison of Micrografx, "The version of Micrografx Designer used with this report has been replaced with Designer version 4.0 which reads these files successfully."

The files were imported into SPC's *Harvard Graphics* v3.05 without a reported error. The background had to be changed in all three files in order to display the complete image.

The CGM files meet the CALS MIL-D-28003 specification.

## 8. Conclusions and Recommendations

The MIL-STD-1840A tape from ArborText had no reported errors in the physical structure or CALS headers and meets the requirements defined in the CALS MIL-STD-1840A.

The IGES file had no reported errors and meets the CALS MIL-D-28000A specification, except for the missing start section compliance statement.

The SGML files meet the CALS MIL-M-28001A specification.

The Raster files meet the CALS MIL-R-28002A specification.

The CGM files had no reported errors. Some of the software, available within the AFCTB, had problems with the background colors. The CGM files meet the CALS MIL-D-28003 specification.

The tape submitted by ArborText meets the CALS MIL-STD-1840A requirements.

## 9. Appendix A - Tapetool Report Logs

### 9.1 Tape Catalog

CALS Test Network Catalog Evaluation - Version 1.2; Release 10 (C)

Standards referenced:

- MIL-STD-1840A (1987) - Automated Interchange of Technical Information
- ANSI X3.27 (1987) - File Structure and labeling of Magnetic Tapes  
for Information Interchange
- ANSI X3.4 (1986) - Coded Character Sets - 7 Bit ASCII

Mon Oct 11 08:05:20 1993

MIL-STD-1840A File Catalog

File Set Directory: /cals/u1210/Set025

Page:  
1

File Name Extracted	File Type	Record Format/ Selected/ Length	Block Length/Total
---			
D001 Extracted	Document Declaration	D/00260	02048/000001
D001C006 Extracted	CGM	F/00080	00800/000039
D001C007 Extracted	CGM	F/00080	00800/000016
D001C010 Extracted	CGM	F/00080	00800/000051
D001G002 Extracted	DTD	D/00260	02048/000019
D001H003 Extracted	Output Specification	D/00260	02048/000041
D001Q008 Extracted	IGES	F/00080	02000/000183
D001R004 Extracted	Raster	F/00128	02048/000005
D001R005 Extracted	Raster	F/00128	02048/000007

AFCTN Test Report  
94-047

AFCTB Test Report  
93-098

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D001R009 Extracted	Raster	F/00128 02048/000015
D001T001 Extracted	Text	D/00260 02048/000028

Catalog Process terminated normally.

---

## 9.2 Tape Evaluation Log

CALS Test Network Tape Evaluation - Version 1.2; Release 10 (C)

Standards referenced:

ANSI X3.27 (1987) - File Structure and labeling of Magnetic Tapes  
for Information Interchange

ANSI X3.4 (1986) - Coded Character Sets - 7 Bit ASCII

Mon Oct 11 08:04:58 1993

ANSI Tape Import Log

Allocating tape drive /dev/rmt0...

/dev/rmt0 allocated.

VOL1CALS01

JCC

4

Label Identifier: VOL1  
Volume Identifier: CALS01  
Volume Accessibility:  
Owner Identifier: JCC  
Label Standard Version: 4

HDR1D001

00010001000100 93273 99364 000000UNIX4.2-MAGEN

Label Identifier: HDR1  
File Identifier: D001  
File Set Identifier:  
File Section Number: 0001  
File Sequence Number: 0001  
Generation Number: 0001  
Generation Version Number: 00  
Creation Date: 93273  
Expiration Date: 99364  
File Accessibility:  
Block Count: 000000  
Implementation Identifier: UNIX4.2-MAGEN

HDR2D0204800260

00

Label Identifier: HDR2  
Recording Format: D  
Block Length: 02048  
Record Length: 00260  
Offset Length: 00



## 9.3 Tape File Set Validation Log

CALS Test Network File Set Evaluation - Version 1.2; Release 10 (C)

Standards referenced:

MIL-STD-1840A (1987) - Automated Interchange of Technical Information

Mon Oct 11 08:05:20 1993

MIL-STD-1840A File Set Evaluation Log

File Set: Set025

Found file: D001

Extracting Document Declaration Header Records...

Evaluating Document Declaration Header Records...

srcsys: ArborText

srcdocid: Air

srcrelid: NONE

chglvl: ORIGINAL

dteisu: 19931001

dstsys: USAF Cals Test Bed, 4027 Col Glen Hwy, Dayton, OH 45431-1601

dstdocid: Air

dstrelid: NONE

dtetrm: 19931001

dlvacc: NONE

filcnt: T1,G1,H1,Q1,R3,C3

ttlcls: UNCLASSIFIED

doccls: UNCLASSIFIED

doctyp: Technical Order

docttl: NONE

Found file: D001C006

Extracting CGM Header Records...

Evaluating CGM Header Records...

srcdocid: Air

dstdocid: Air

txtfilid: W

figid: NONE

srcgph: igesmap

doccls: UNCLASSIFIED

notes: NONE

Saving CGM Header File: D001C006\_HDR

Saving CGM Data File: D001C006\_CGM



<<<<< PART OF LOG FILE REMOVED HERE >>>>>

Found file: D001T001  
Extracting Text Header Records...  
Evaluating Text Header Records...

srcdocid: Air  
dstdocid: Air  
txtfilid: W  
doccls: UNCLASSIFIED  
notes: SGML

Saving Text Header File: D001T001\_HDR  
Saving Text Data File: D001T001\_TXT

Evaluating numbering scheme...  
No errors were encountered during numbering scheme evaluation.  
Numbering scheme evaluation complete.

Checking file count...  
No errors were encountered during file count verification.  
File Count verification complete.

No errors were encountered in Document D001.

No errors were encountered in this File Set.

MIL-STD-1840A File Set Evaluation Complete.

---

## 10. Appendix B - Detailed IGES Analysis

### 10.1 File D001Q008

#### 10.1.1 Parser/Verifier Log

```
*****
*****  IGES PARSE/VERIFIER  *****
*****      MARCH 1993      *****
*****  IGES Data Analysis  *****
*****    (708) 344-1815    *****
*****
```

Input file is /mnt/u1210/Set025/D001/D001Q008\_IGS

Checking conformance to CALS Class I (MIL-D-28000A 2/10/92)

Today is October 11, 1993 10:31 AM

```
*****
*****  CHECK FILE SYNTAX  *****
*****
```

Section	Records
Start	10
Global	3
Directory	2572 ( 1286 Entities)
Parameter	1972
Terminate	1

WARNING 2454: Excess PD parameters specified for D 1.

```
*****
*****  SUMMARY AND STATISTICS  ****
*****
```

#### \*\*\* File and Product Name Information \*\*\*

```
File name from sender   = './CTNOUT/d001q008.data'
File creation Date.Time = '931001.125951'
Model change Date.Time  = ''
Author                  = ''
Department               = ''
Product name from sender = 'Air/hook1.igs'
```

---

Destination product name = ''

\*\*\* Parameter Delimiters \*\*\*

Delimiter = ','  
Terminator = ';'

\*\*\* Originating System Data \*\*\*

System ID = 'ArborText Inc. - IslandDraw'  
Preprocessor version = 'draw2iges Version 4.0'  
Specification version = 6 (IGES 4.0)

\*\*\* Precision levels \*\*\*

Integer bits = 32  
Floating point - Exponent = 308 Mantissa = 15  
Double precision - Exponent = 308 Mantissa = 15

\*\*\* Global Model Data \*\*\*

Model scale = 1.0000E+00  
Unit flag = 2  
Units = 'MM'  
Line weights = 1000  
Maximum line thickness = 1.000000E+01  
Minimum line thickness = 1.000000E-02  
Granularity = 1.000000E-02  
Maximum coordinate = 1.685790E+02

Drafting standard applicable to original data is not specified.

\*\*\* Status Flag Summary \*\*\*

Blank status:	Visible	1286
	Blanked	0
Independence:	Independent	1281
	Physically Subordinate	0
	Logically Subordinate	5
	Totally Subordinate	0
Entity use:	Geometry	0
	Annotation	1286
	Definition	0
	Other	0
	Logical/Positional	0
	2D parametric	0
	Construction geometry	0

	Not Specified	0
Hierarchy:	Structure DE applies	0
	Subordinate DE applies	1286
	Hierarchy property applies	0
	Not Specified	0

\*\*\* Entity Occurrence Counts \*\*\*

Entity	Form	Level	Count	Type
-----	----	-----	-----	----
106	11	0	326	Copious data - Piecewise planar, linear string(2D linear path)
110	0	0	716	Line
212	0	0	238	General note
404	0	0	1	Drawing
406	16	0	1	Property - Drawing size
406	8301	0	1	IDA Property - Text style
+ 406	8305	0	2	Implementor entity instance
410	0	0	1	View - Orthographic parallel

+ Indicates use of a Implementor defined form or entity.

\*\*\* Entity Count by Level \*\*\*

Level	Count
0	1286

\*\*\* Labeling Information \*\*\*

0% of the entities are labeled.

Unlabeled	1286
-----------	------

\*\*\* Line Fonts Used in Data \*\*\*

100	102	104	106	108	110	112	114	
-	-	-	-	-	-	-	-	Undefined
-	-	-	326	-	716	-	-	Solid

<<<<< PART OF LOG FILE REMOVED HERE >>>>>

\*\*\* Line Widths Used in Data \*\*\*

Weight	Count	Width
--------	-------	-------

---

Defaulted	1042	(0.0100)
1	6	(0.0100)
10	238	(0.1000)

\*\*\* Colors Used in Data \*\*\*

Defaulted	6
Black	1280

\*\*\*\*\*  
\*\*\*\*\* ENTITY ANALYSIS \*\*\*\*\*  
\*\*\*\*\*

\*\*\* Entity type: 106

\*\*\* Entity type: 110

-- 716 lines averaging 7.201886E+00 units --

\*\*\* Entity type: 212

238 text strings in data file.  
Average text aspect ratio in file is 0.9074217.  
Minimum text aspect ratio in file is 0.4679342.  
Maximum text aspect ratio in file is 0.9307852.

FONTS USED IN FILE

FONT	COUNT	NAME
1	238	Default ASCII Style

\*\*\* Entity type: 404

Drawing at D 5 contains 1 views.  
Drawing at D 5 contains 0 annotation entities.

\*\*\* Entity type: 406

\*\*\* Entity type: 410

Scale of view at D 1 is 1.000000E+00.  
Orthographic View entity at D 1 has 0 clipping planes specified.  
XMIN = Not Set XMAX = Not Set  
YMIN = Not Set YMAX = Not Set  
ZMIN = Not Set ZMAX = Not Set

\*\*\* Message Summary \*\*\*

\*\*\* Error Summary \*\*\*

0 fatal errors  
0 severe errors  
0 errors  
1 warnings  
0 cautions  
0 nitpicks  
0 notes

\*\*\* End of Analysis of /mnt/u1210/Set025/D001/D001Q008\_IGS \*\*\*

## 10.1.2 Parser Log - AutoCAD R12

Title: IGESIN Journal (v5.1 Nov 05 1992)

File: C:/9398/Q008.xli

Date: Mon, Oct 11, 1993

Time: 11:25:49

EVALUATION VERSION -- NOT FOR RESALE

Translator S/N: 117-10075750

Translating from IGES file: C:/9398/Q008.IGS  
to AutoCAD Drawing: C:\9398\Q008.dwg

Options obtained from: default settings

Curves Approximated to Tolerance of 0.01

Surfaces Approximated to Tolerance of 0.01

Text Font/Style mapping:

IGES Text font	Style Name	ACAD Font
0	SYMBOL0	iges0
1	STANDARD	txt
2	LEROY	txt
3	FUTURA	txt
6	COMP80	txt
12	GOTHICE	gothice
13	GOTHICI	gothici
14	ROMANS	romans
17	ROMANT	romant
18	ROMAND	romand

19	OCR	txt
1001	SYMBOL1	iges1001
1002	SYMBOL2	iges1002
1003	SYMBOL3	iges1003
2001	KANJI	bigfont

IGES Linefont/AutoCAD Linetype mapping

IGES Line Font	AutoCAD linetype	Shape file
0	BYLAYER	
1	CONTINUOUS	
2	DASHED	acad.lin
3	PHANTOM	acad.lin
4	CENTER	acad.lin
5	DOT	acad.lin

Parse phase

\*\*\* Warning (IAFP\_LARGER\_SGL\_EXP) \*\*\*

C:/9398/Q008.IGS, line 13: IGES file contains numbers with a larger single precision exponent than what is allowed on this system.

\*\*\* Warning (IAFP\_LARGER\_SGL\_SIG) \*\*\*

C:/9398/Q008.IGS, line 13: IGES file has greater number of significant digits in single precision numbers than this system.

\*\*\* Warning (IAFP\_UNKNOWN\_PROP) \*\*\*

C:/9398/Q008.IGS, line 2589: Unknown property form. Property assumed to be in standard IGES property format.

\*\*\* Warning (IAFP\_UNKNOWN\_PROP) \*\*\*

C:/9398/Q008.IGS, line 2822: Unknown property form. Property assumed to be in standard IGES property format.

\*\*\* Warning (IAFP\_UNKNOWN\_PROP) \*\*\*

C:/9398/Q008.IGS, line 2823: Unknown property form. Property assumed to be in standard IGES property format.

Start Section:

THIS FILE CONTAINS ILLUSTRATIONS FOR A

TECHNICAL DOCUMENT IN MIL-D-28000 CLASS I FORM

Fri Oct 1 12:59:50 EDT 1993

Air/hook1.igs

Global Section:

Parameter Delimiter: ,  
Record Delimiter: ;  
Sending Product ID: Air/hook1.igs  
File Name: ./CTNOUT/d001q008.data  
System ID: ArborText Inc. - IslandDraw  
Preprocessor Version: draw2iges Version 4.0  
Size of Integer: 32  
Sgl. Precision Mag: 308  
Sgl. Precision Sig: 15  
Dbl. Precision Mag: 308  
Dbl. Precision Sig: 15  
Receiving Product ID:  
Model Space Scale: 1.000000  
Unit Flag: 2  
Unit String: MM  
# of Line Weights: 1000  
Maximum Line Width: 10.000000  
Creation Date: 10/01/93 12:59:51  
Minimum Resolution: 0.010000  
Maximum Coordinate: 168.579000  
Author:  
Organization:  
IGES Version Number: 6  
Drafting Standard: 0

Entity Summary:

Type	Form	Description	Count
106	11	Planar Piecewise Linear Curve	326
110	0	Line	716
212	0	General Note (Simple)	238
404	0	Drawing (form 0)	1
406	16	Property (Drawing Size)	1
406	10000	Implementor Defined Property	3
410	0	View	1
Total			1286

=====

Translation phase

Drawing Entity (404 Form 0) at DE 5, with  
name = ,  
size = 178.110000, 140.699000,  
units = MM,



was processed in the AutoCAD drawing file: C:\9398\Q008.dwg

\*\*\* Warning (ACAD\_NEW\_VIEW\_VOLUME\_GENERATED) \*\*\*

( DE: 1 TF: 410:0 )

A new view volume has been generated for the view with:

XMIN (-10.576631), XMAX (188.686631),  
YMIN (-11.295631), YMAX (151.945701),  
ZMIN (-20.107631), ZMAX (20.107631).

#### IGES Entity Summary

Type	Form	Description	Count	Processed	Errors
106	11	Planar Piecewise Linear Curve	326	326	0
110	0	Line	716	716	0
212	0	General Note (Simple)	238	238	0
404	0	Drawing (form 0)	1	1	0
406	16	Property (Drawing Size)	1	1	0
410	0	View	1	1	0
Totals			1283	1283	0

#### Unsupported IGES Entity Summary

Type	Form	Description	Count
406	10000	Implementor Defined Property	3
Total			3

#### AutoCAD Entity Summary

Entity	Created	Errors
LINE	716	0
TEXT	238	0
POLYLINE	326	0
Totals	1280	0

#### Error Summary:

The following message was issued 1 time(s)  
IGES file contains numbers with a larger single precision exponent than what is allowed on this system.

The following message was issued 1 time(s)  
IGES file has greater number of significant digits in single precision numbers  
than this system.

The following message was issued 3 time(s)  
Unknown property form. Property assumed to be in standard IGES property format.

The following message was issued 1 time(s)  
A new view volume has been generated for the view with:  
XMIN (%lf), XMAX (%lf),  
YMIN (%lf), YMAX (%lf),  
ZMIN (%lf), ZMAX (%lf).

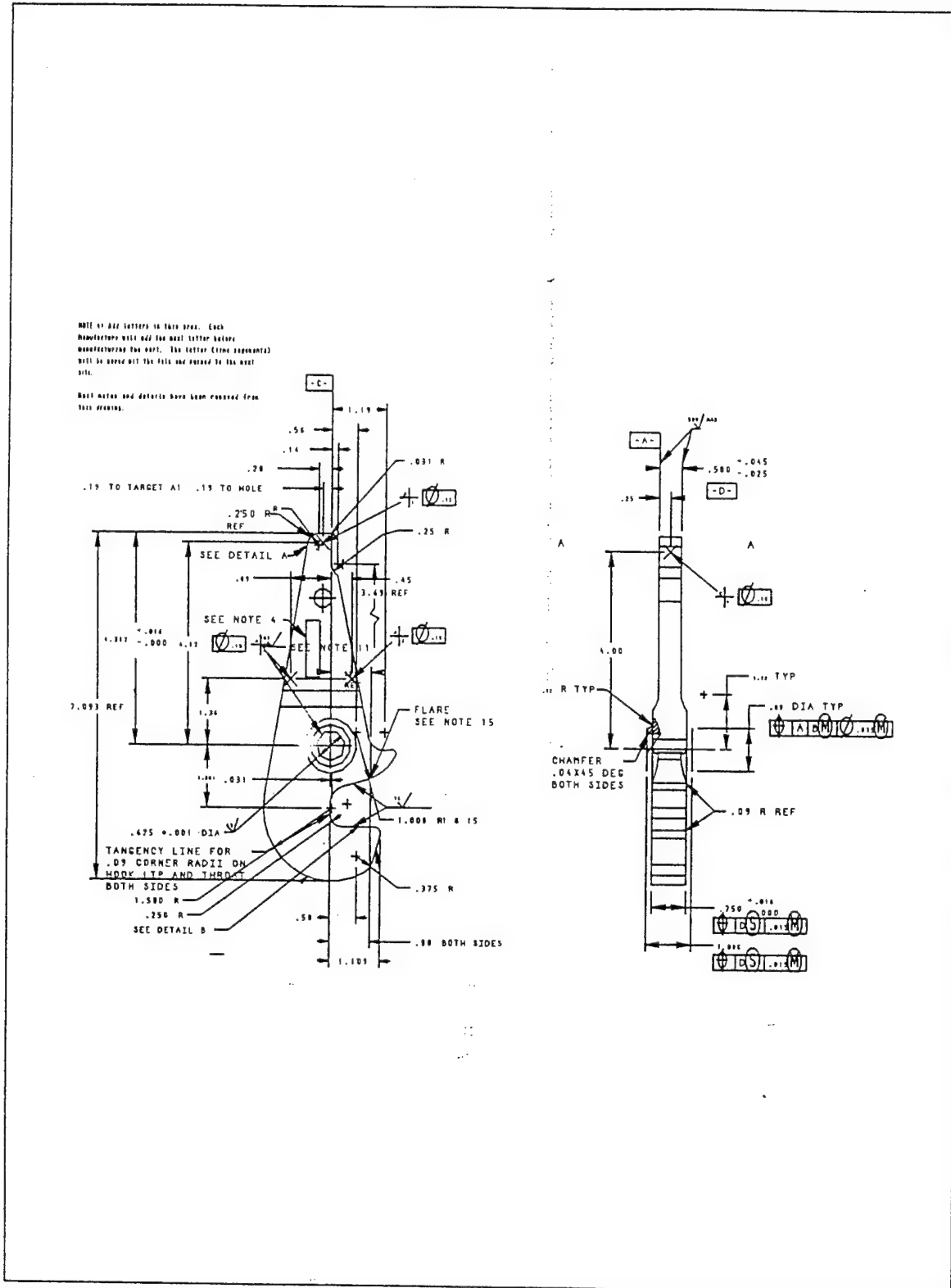
Status: 0  
Warning: 6  
Error: 0  
Fatal: 0

Elapsed Time:

Processor: 00:00:44  
Clock: 00:00:44

=====

### 10.1.3 Output IGESWorks



---

## 11. Appendix C - Detailed SGML Analysis

### 11.1 DataLogic Parser Log

#### 11.1.1 DTD Parser Log

SGML Document Type Definition Parser  
An SGML System Conforming to  
International Standard ISO 8879  
Standard Generalized Markup Language

Log file: '9398.LOG'  
SDO File: 'ctnddecl.sdo'  
Namecase General is yes.  
Namecase Entity is no.  
Parsing DTD file: '9398.dtd'  
<!DOCTYPE doc Parsing DOCTYPE DOC  
  
<!ENTITY alpha DTD0143: Attempt to declare general entity name 'alpha'  
more than once denied.  
In declaration: '<!ENTITY'.  
In declaration: '<!['.  
In declaration: '<!['.  
In declaration: '<!['.  
In declaration: '<!['.  
In declaration: '<!DOCTYPE'.  
in line 11 in file '\public\iso\$grk3.ent'  
in line 133 in file '9398.dtd'  
SDATA "[alpha ]"--=small alpha, Greek-->

<<<<< PART OF LOG FILE REMOVED HERE >>>>>

DTD0096: The generic ID SHORTTITLE has not been used in any content  
model, inclusion, or as a doctype element.  
This DTD conforms to the ISO 8879 standard

DTO file '9398.DTO' created  
closing statistics:

Capacity points:	59848
Bytes of DTO file string space:	11198
SGML descriptor blocks:	5991

Document Type Definition is compliant and parsed normally.

Program status code: 0.

## 11.2 Exoterica validator exl Parser

```
<!-- **Warning** in "iso-num.ent" (entity "%ISOnum"), line 26,
      used in "9398.sgm", line 1:
      A general entity name has been declared more than once.
      The entity is "lt".
      <!ENTITY lt      SDATA "[lt      ]"--=less-than sign R:-->
      ^^

-->
<!-- **Warning** in "iso-num.ent" (entity "%ISOnum"), line 40,
      used in "9398.sgm", line 1:
      A general entity name has been declared more than once.
      The entity is "amp".
      <!ENTITY amp      SDATA "[amp      ]"--=ampersand-->
      ^^^

-->
<!-- **Warning** in "9398.sgm", line 1:
      An element is not allowed in the document instance because it does not
      appear in any accessible content model or it is completely excluded.
      The element is "SHORTTITLE".

-->
<!-- **Warning** in "9398.sgm", line 1:
      There is no element with an IDREF or IDREFS attribute value equal to a
      specified ID value.
      The unreferenced ID attribute value is "BPWCHTWC".

-->
<!-- 4 warnings reported. -->
```

## 11.3 Public Domain sgmls Log

### 11.3.1 DTD Report

TOTALCAP 119819/200000 ENTCAP 9440/200000 ENTCHCAP 6820/200000 ELEMCA  
4768/200000 GRPCAP 41824/200000 EXGRPCAP 416/200000 EXNMCA 896/200000  
ATTCA 37536/200000 ATTCHCAP 516/200000 AVGRPCAP 17344/200000 NOTCA  
96/200000 NOTCHCAP 163/200000

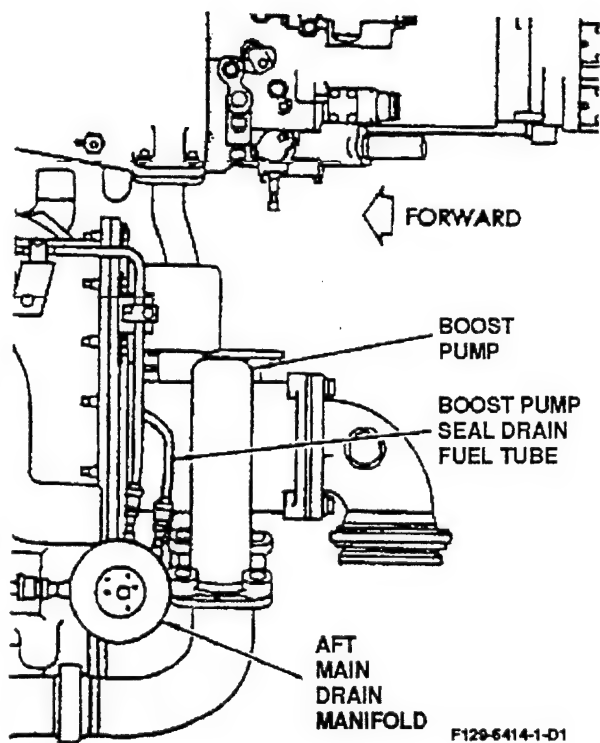
### 11.3.2 Text Parser Log

TOTALCAP 119883/200000  
ENTCAP 9440/200000  
ENTCHCAP 6820/200000  
ELEMCA 4768/200000  
GRPCAP 41824/200000  
EXGRPCAP 416/200000  
EXNMCA 896/200000  
ATTCA 37536/200000  
ATTCHCAP 516/200000  
AVGRPCAP 17344/200000  
NOTCA 96/200000  
NOTCHCAP 163/200000  
IDCAP 64/200000

## 12. Appendix D - Detailed Raster Analysis

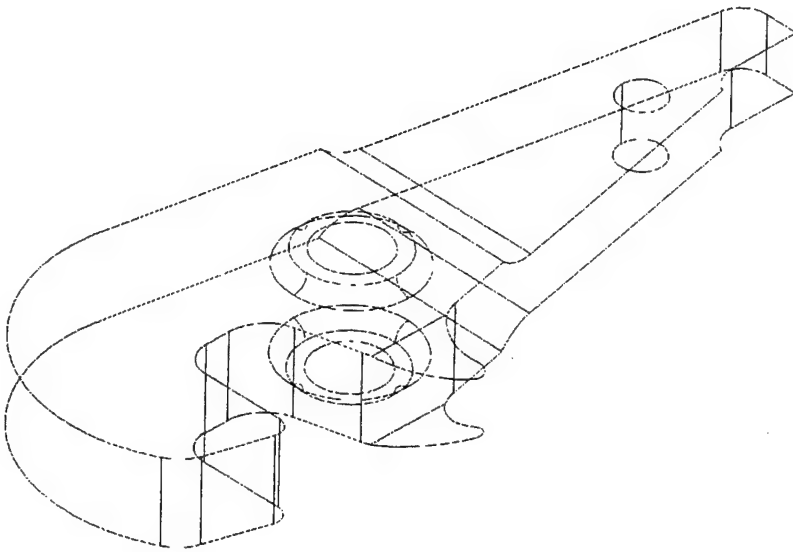
### 12.1 File D001R004

#### 12.1.1 Output g42tiff/IslandPaint



## 12.2 File D001R005

### 12.2.1 Output IGESView

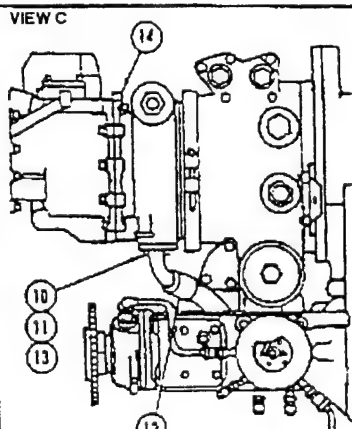
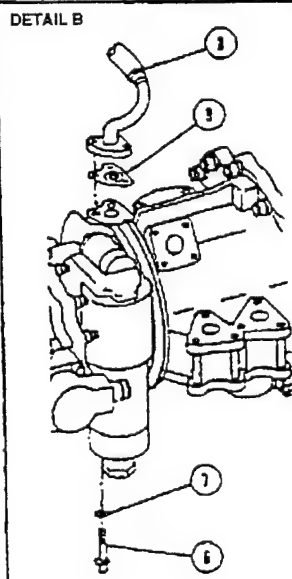
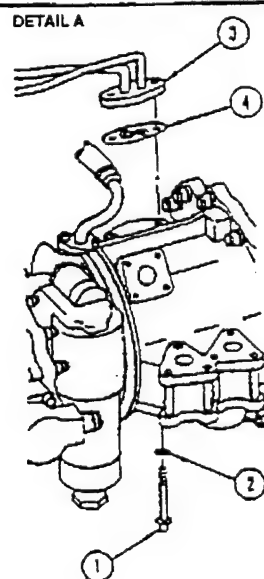
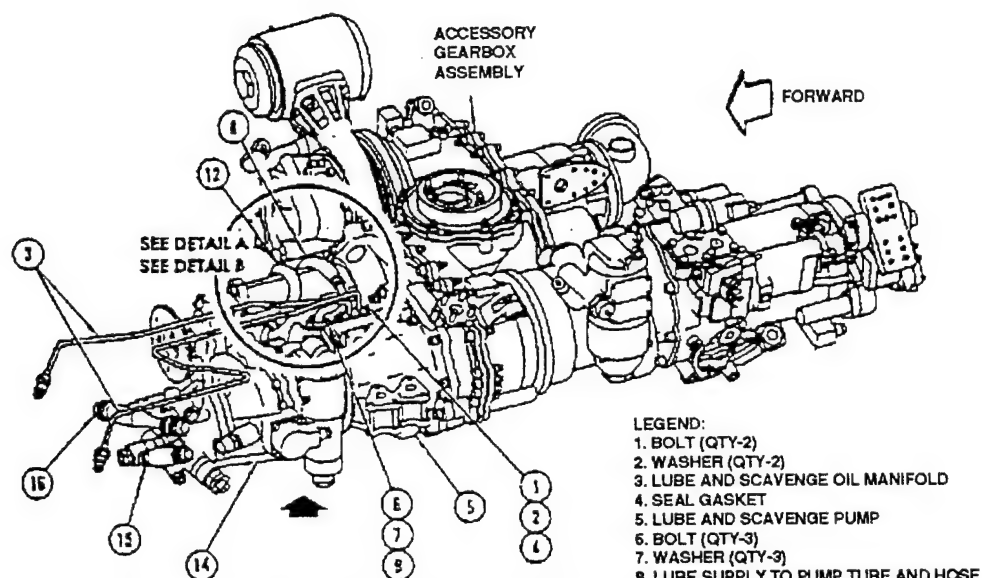




## 12.3 File D001R009

### 12.3.1 Output g42tiff/IslandPaint

TO 2J-F110-16-6  
WP 003 00



P129-6413-1-A2A

## 13. Appendix E - Detailed CGM Analysis

### 13.1 File D001C006

#### 13.1.1 Parser Log MetaCheck

MetaCheck Version 2.10 -- CGM/MIL-D-28003 Conformance Analyzer  
Copyright 1988-93 CGM Technology Software  
Execution Date: 10/11/93 Time: 10:50:59

Metafile Examined : \9398\c006.cgm

Pictures Examined : All

Elements Examined : All

Bytes Examined : All

===== Trace Report =====

Tracing not selected.

===== CGM Conformance Violation Report =====

No Errors Detected

===== CALS CGM Profile (MIL-D-28003) Report =====

No profile discrepancies detected.

===== Conformance Summary Report =====

MetaCheck Version 2.10 -- CGM/MIL-D-28003 Conformance Analyzer  
Copyright 1988-93 CGM Technology Software  
Execution Date: 10/11/93 Time: 10:51:05

Name of CGM under test: \9398\c006.cgm

Encoding : Binary

Pictures Examined : All

Elements Examined : All

Bytes Examined : All

BEGIN METAFILE string : >Air/igesmap.cgm<

METAFILE DESCRIPTION : >Arbor Text draw2cgm version 1.06 \*\*\*<  
> MIL-D-28003/BASIC-1<

---

---

Conformance Summary : This file conforms to the CGM specification.  
This file meets the CALS CGM Profile (MIL-D-28003).

Summary of Testing Performed and Errors Found:

1 Pictures Tested  
519 Elements Tested  
30184 Octets Tested

=====  
| No Errors Were Detected |  
=====

===== End of Conformance Report =====

## 13.1.2 validcgm Log

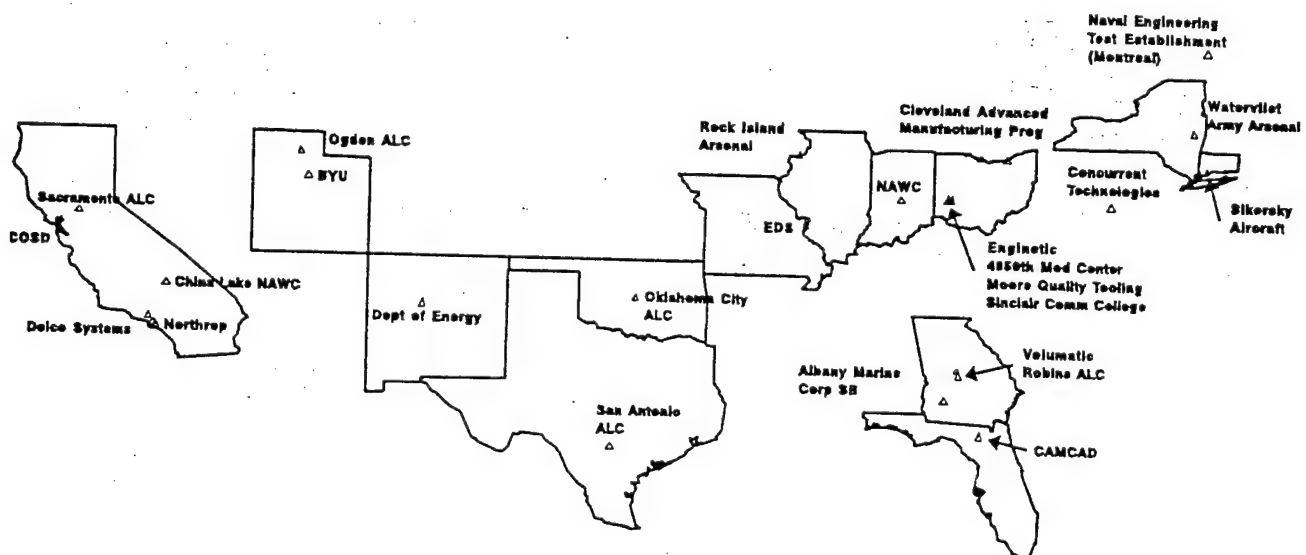
Analysis for file c006.cgm using table table  
ERROR: invalid times used per CGM (2), std B  
ERROR: invalid times used per Picture (2), std B  
(14, 142) (1, 12, 10) Metafile Defaults Replacement  
ERROR: illegal in this state (2), std B  
ERROR: required precursor (0, 3) not yet seen  
(14.1, 0) (2, 6, 8) VDC Extent (0, 0) (32767, 32767)  
ERROR: invalid times used per CGM (3), std B  
ERROR: invalid times used per Picture (3), std B  
(15, 154) (1, 12, 4) Metafile Defaults Replacement  
ERROR: illegal in this state (2), std B  
ERROR: required precursor (0, 4) not yet seen  
(15.1, 0) (5, 11, 2) Text Precision Stroke  
(0, 1) occurred 1 time  
(0, 2) occurred 1 time  
(0, 3) occurred 1 time  
(0, 4) occurred 1 time  
(0, 5) occurred 1 time  
(1, 1) occurred 1 time  
(1, 2) occurred 1 time  
(1, 3) occurred 1 time  
(1, 4) occurred 1 time  
(1, 5) occurred 1 time  
(1, 6) occurred 1 time  
(1, 7) occurred 1 time  
(1, 8) occurred 1 time  
(1, 9) occurred 1 time  
(1, 10) occurred 1 time  
(1, 11) occurred 1 time

(1, 12) occurred 3 times  
(1, 12) occurred illegally 2 times  
(1, 15) occurred 1 time  
(2, 1) occurred 1 time  
(2, 2) occurred 1 time  
(2, 3) occurred 1 time  
(2, 4) occurred 1 time  
(2, 5) occurred 1 time  
(2, 6) occurred 2 times  
(2, 6) occurred illegally 1 time  
(2, 7) occurred 1 time  
(3, 1) occurred 1 time  
(4, 1) occurred 20 times  
(4, 7) occurred 458 times  
(5, 11) occurred 1 time  
(5, 11) occurred illegally 1 time  
(5, 22) occurred 5 times  
(5, 23) occurred 3 times  
(5, 28) occurred 1 time  
(5, 30) occurred 4 times  
(5, 34) occurred 1 time

### 13.1.3 Output Harvard Graphics



## IGES TRANSFER TEST MANUFACTURING LOCATIONS



## 13.2 File D001C007

### 13.2.1 Parser Log MetaCheck

MetaCheck Version 2.10 -- CGM/MIL-D-28003 Conformance Analyzer  
Copyright 1988-93 CGM Technology Software  
Execution Date: 10/11/93 Time: 10:51:18

Metafile Examined : \9398\c007.cgm

Pictures Examined : All

Elements Examined : All

Bytes Examined : All

===== Trace Report =====

Tracing not selected.

===== CGM Conformance Violation Report =====

No Errors Detected

===== CALS CGM Profile (MIL-D-28003) Report =====

No profile discrepancies detected.

===== Conformance Summary Report =====

MetaCheck Version 2.10 -- CGM/MIL-D-28003 Conformance Analyzer  
Copyright 1988-93 CGM Technology Software  
Execution Date: 10/11/93 Time: 10:51:21

Name of CGM under test: \9398\c007.cgm

Encoding : Binary

Pictures Examined : All

Elements Examined : All

Bytes Examined : All

BEGIN METAFILE string : >Air/seal.cgm<

METAFILE DESCRIPTION : >Arbor Text draw2cgm version 1.06 \*\*\*<  
> MIL-D-28003/BASIC-1<

Conformance Summary : This file conforms to the CGM specification.  
This file meets the CALS CGM Profile (MIL-D-28003).

---

---

Summary of Testing Performed and Errors Found:

1 Pictures Tested  
289 Elements Tested  
11442 Octets Tested

```
=====
|      No Errors Were Detected      |
=====
```

===== End of Conformance Report =====

## 13.2.2 validcgm Log

Analysis for file c007.cgm using table table

ERROR: invalid times used per CGM (2), std B

ERROR: invalid times used per Picture (2), std B

(14, 140) (1, 12, 10) Metafile Defaults Replacement

ERROR: illegal in this state (2), std B

ERROR: required precursor (0, 3) not yet seen

(14.1, 0) (2, 6, 8) VDC Extent (0, 0) (32767, 32767)

ERROR: invalid times used per CGM (3), std B

ERROR: invalid times used per Picture (3), std B

(15, 152) (1, 12, 4) Metafile Defaults Replacement

ERROR: illegal in this state (2), std B

ERROR: required precursor (0, 4) not yet seen

(15.1, 0) (5, 11, 2) Text Precision Stroke

(0, 1) occurred 1 time

(0, 2) occurred 1 time

(0, 3) occurred 1 time

(0, 4) occurred 1 time

(0, 5) occurred 1 time

(1, 1) occurred 1 time

(1, 2) occurred 1 time

(1, 3) occurred 1 time

(1, 4) occurred 1 time

(1, 5) occurred 1 time

(1, 6) occurred 1 time

(1, 7) occurred 1 time

(1, 8) occurred 1 time

(1, 9) occurred 1 time

(1, 10) occurred 1 time

(1, 11) occurred 1 time

(1, 12) occurred 3 times

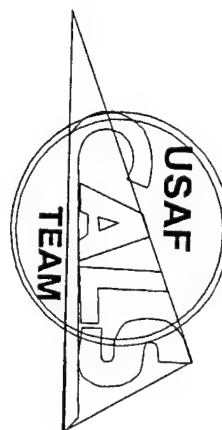
(1, 12) occurred illegally 2 times

(1, 13) occurred 1 time

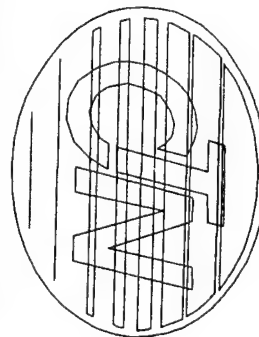
(1, 15) occurred 1 time  
(2, 1) occurred 1 time  
(2, 2) occurred 1 time  
(2, 3) occurred 1 time  
(2, 4) occurred 1 time  
(2, 5) occurred 1 time  
(2, 6) occurred 2 times  
(2, 6) occurred illegally 1 time  
(2, 7) occurred 1 time  
(3, 1) occurred 1 time  
(4, 1) occurred 13 times  
(4, 4) occurred 42 times  
(4, 7) occurred 126 times  
(5, 11) occurred 2 times  
(5, 11) occurred illegally 1 time  
(5, 12) occurred 1 time  
(5, 15) occurred 1 time  
(5, 16) occurred 22 times  
(5, 18) occurred 1 time  
(5, 22) occurred 42 times  
(5, 23) occurred 3 times  
(5, 28) occurred 1 time  
(5, 30) occurred 7 times  
(5, 34) occurred 1 time



### 13.2.3 Designer



CALS TEST NETWORK



---

## 13.3 File D001C010

### 13.3.1 Parser Log MetaCheck

MetaCheck Version 2.10 -- CGM/MIL-D-28003 Conformance Analyzer  
Copyright 1988-93 CGM Technology Software  
Execution Date: 10/11/93 Time: 10:51:32

Metafile Examined : \9398\c010.cgm

Pictures Examined : All  
Elements Examined : All  
Bytes Examined : All

===== Trace Report =====

Tracing not selected.

===== CGM Conformance Violation Report =====

No Errors Detected

===== CALS CGM Profile (MIL-D-28003) Report =====

No profile discrepancies detected.

===== Conformance Summary Report =====

MetaCheck Version 2.10 -- CGM/MIL-D-28003 Conformance Analyzer  
Copyright 1988-93 CGM Technology Software  
Execution Date: 10/11/93 Time: 10:51:40

Name of CGM under test: \9398\c010.cgm  
Encoding : Binary

Pictures Examined : All  
Elements Examined : All  
Bytes Examined : All

BEGIN METAFILE string : >Air/sgmlmap.cgm<  
METAFILE DESCRIPTION : >Arbor Text draw2cgm version 1.06 \*\*\*<  
> MIL-D-28003/BASIC-1<

Conformance Summary : This file conforms to the CGM specification.  
This file meets the CALS CGM Profile (MIL-D-28003).

---

Summary of Testing Performed and Errors Found:

1 Pictures Tested  
2767 Elements Tested  
39646 Octets Tested

```
=====
|   No Errors Were Detected   |
=====
```

===== End of Conformance Report =====

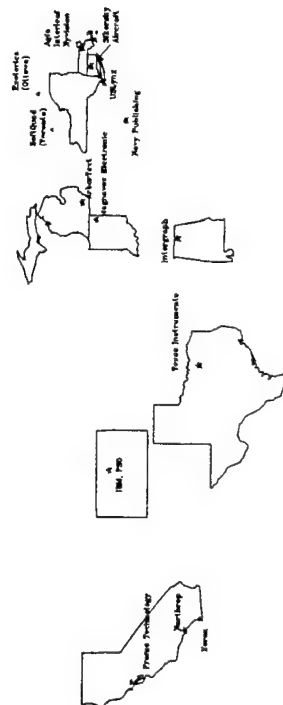
### 13.3.2 validcgm Log

Analysis for file c010.cgm using table table  
ERROR: invalid times used per CGM (2), std B  
ERROR: invalid times used per Picture (2), std B  
(14, 142) (1, 12, 10) Metafile Defaults Replacement  
ERROR: illegal in this state (2), std B  
ERROR: required precursor (0, 3) not yet seen  
(14.1, 0) (2, 6, 8) VDC Extent (0, 0) (32767, 32767)  
ERROR: invalid times used per CGM (3), std B  
ERROR: invalid times used per Picture (3), std B  
(15, 154) (1, 12, 4) Metafile Defaults Replacement  
ERROR: illegal in this state (2), std B  
ERROR: required precursor (0, 4) not yet seen  
(15.1, 0) (5, 11, 2) Text Precision Stroke  
(0, 1) occurred 1 time  
(0, 2) occurred 1 time  
(0, 3) occurred 1 time  
(0, 4) occurred 1 time  
(0, 5) occurred 1 time  
(1, 1) occurred 1 time  
(1, 2) occurred 1 time  
(1, 3) occurred 1 time  
(1, 4) occurred 1 time  
(1, 5) occurred 1 time  
(1, 6) occurred 1 time  
(1, 7) occurred 1 time  
(1, 8) occurred 1 time  
(1, 9) occurred 1 time  
(1, 10) occurred 1 time  
(1, 11) occurred 1 time  
(1, 12) occurred 3 times  
(1, 12) occurred illegally 2 times  
(1, 15) occurred 1 time

(2, 1) occurred 1 time  
(2, 2) occurred 1 time  
(2, 3) occurred 1 time  
(2, 4) occurred 1 time  
(2, 5) occurred 1 time  
(2, 6) occurred 2 times  
(2, 6) occurred illegally 1 time  
(2, 7) occurred 1 time  
(3, 1) occurred 1 time  
(4, 1) occurred 2713 times  
(4, 7) occurred 20 times  
(5, 11) occurred 1 time  
(5, 11) occurred illegally 1 time  
(5, 22) occurred 4 times  
(5, 23) occurred 2 times  
(5, 34) occurred 1 time

### 13.3.3 Output Freelance

#### CALS EXPO SGML TRANSFER TEST



## 14. APPENDIX F - Complete Document

### EXPO92 DEMO

---

#### TECHNICAL MANUAL

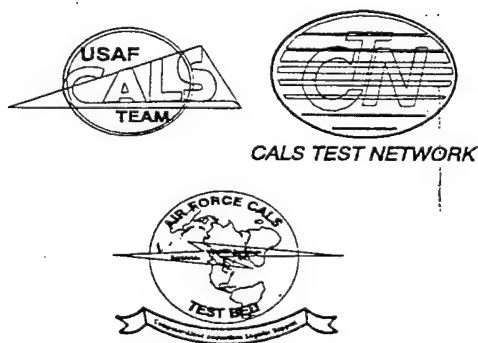
Sample Text

#### IGES TRANSFER MANUFACTURING DEMONSTRATION

#### SGML TRANSFER DEMONSTRATION

Air Force CALS Test Bed

SGML Transfer Demonstration



DISCLAIMER: Neither the United States Government or Air Force nor any of their employees, makes any warranty for accuracy or usefulness of any apparatus, product, or process used to create this test document. Reference herein to any specific commercial products, process, or service by trade name, trademark manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or the Air Force.

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15 February 1993

## TABLE OF CONTENTS

Chapter	Page	Chapter	Page
TABLE OF CONTENTS . . . . .	i	1.7.4 Notes by Next Participant . . . . .	1-9
LIST OF ILLUSTRATIONS . . . . .	ii	<b>2 Sample Page - Tech Order . . . . .</b>	<b>2-1</b>
LIST OF TABLES . . . . .	iii	2.1 Sample Tech Order . . . . .	2-1
<b>1 Introduction . . . . .</b>	<b>1-1</b>	<b>3 The SGML Transfer Story . . . . .</b>	<b>3-1</b>
1.1 Purpose . . . . .	1-1	3.1 Part One - The Start . . . . .	3-1
1.2 Background . . . . .	1-1	3.2 Part Two - Edna Begins Her Story, By US	
1.3 The IGES Transfer . . . . .	1-1	Lynx . . . . .	3-1
1.4 IGES Transfer Test . . . . .	1-3	3.3 Part Three - Blood, Blood, and more...Blood,	
1.5 Document Transfer Test . . . . .	1-4	by Data Conversion Laboratory . . . . .	3-1
1.6 How This Document Was Created . . . . .	1-4	3.4 PART FOUR — MEANING IN "38784", BY	
1.7 Notes by Document Transfer Participants . . . . .	1-8	INTERLEAF . . . . .	3-2
1.7.1 US Lynx Inc. . . . .	1-8	3.5 Part FIVE - Possessed by ELVIS . . . . .	3-2
1.7.2 Interleaf, Inc . . . . .	1-8	3.6 Part Six . . . . .	3-2
1.7.3 ArborText, Inc . . . . .	1-9		

## LIST OF ILLUSTRATIONS

Figure	Title	Page	Figure	Title	Page
1-1	IGES Model . . . . .	1.1	2-5	Manifold, Lube Tube and Hose, and Hydraulic Tube and Hose Removal . . . . .	2.1
1-2	Complete IGES Drawing . . . . .	1.2	2-6	Boost Pump Seal Drain Fuel Tube Removal . . . . .	2.2
1-3	Map Showing IGES Participant Locations . . . . .	1.4			
1-4	Map Showing SGML Participant Locations . . . . .	1.7			



## LIST OF TABLES

Number	Title	Page	Number	Title	Page
1-1	CALS IGES TRANSFER PARTICIPANTS	. 1.3	1-2	CALS SGML TRANSFER PARTICIPANTS	. 1.5

# CHAPTER 1

## Introduction

### 1.1 Purpose

The Air Force CALS Test Bed (AFCTB) is tasked to evaluate CALS Technical Documentation standards. In order to accomplish this task, the AFCTB accepts and evaluates submissions from members of the CALS Test Network (CTN). As part of the evaluation the AFCTB has the ability to test CALS IGES (MIL-D-28000A), SGML (MIL-M-28001), raster (MIL-R-28002) and Computer Graphics Metafile (CGM) (MIL-D-28003) file types.

As part of the evaluation process, the AFCTB also provides files for evaluation by members of the CTN. This document is part of the on going testing of the CALS standards.

### 1.2 Background

This document provides the background of the dual CALS data transfer testing being run by the AFCTB for AutoFACT 92 and CALS EXPO 92. These tests will provide CALS data in both MIL-STD-1840A 9-track tape and an electronic transfer method showing the ability and capabilities of CALS data.

Track one in the test is a serial IGES transfer. The IGES file will be modified using different IGES translators and a part will be manufactured from the resulting file at each site. The data will be transferred electronically with a goal of a complete circuit in less than two weeks. Each site will send the manufactured part to the AFCTB which will display them at

both AutoFact 92 and CALS EXPO 92. The sites involved in this transfer test are both military and commercial companies. The companies are both small and large businesses.

Track two is a complete CALS document transfer test. This will be the first test of multiple document systems with one document handled serially. The document consists of text, IGES, raster and CGM graphic 28000 standard images. The document will be started from the AFCTB on a MIL-STD-1840A 9-track tape. It will be passed through ten or more companies which will add a paragraph or two and graphics. The results will be published and then sent to the next site on a MIL-STD-1840A tape and a second copy will be sent to the AFCTB for validation. Military and commercial companies in both the U.S. and Canada will participate in this test.

### 1.3 The IGES Transfer

The basic IGES file was provided to the AFCTB by the Naval Air Warfare Center (NAWC) in Indianapolis IN. The file provided is an old Navy and Marine Corp part used on fighter aircraft to hold bombs on the wings. The part is a hook used for this purpose. While the hook in this demonstration is a Navy part, all services use similar hooks on their aircraft to hold weapons. The part used by the Navy starts as a forging which is then machined. For this demonstration, each site will use available material to manufacture the part.

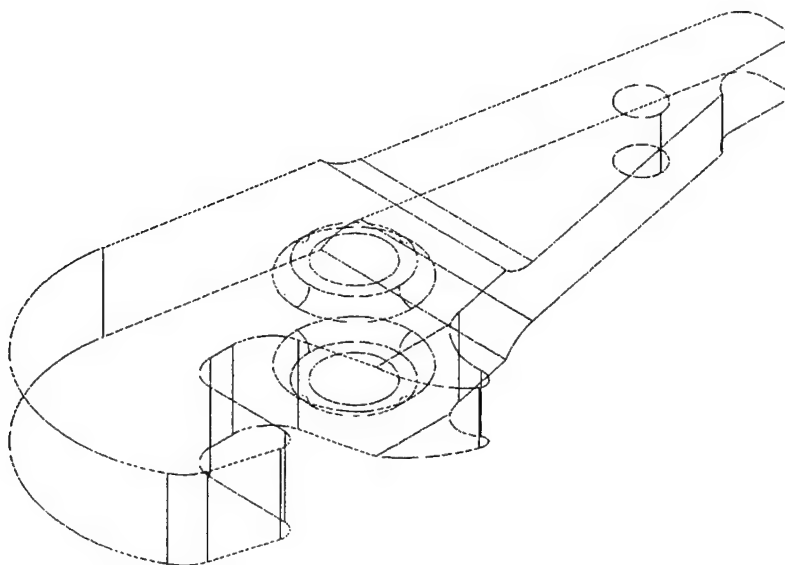
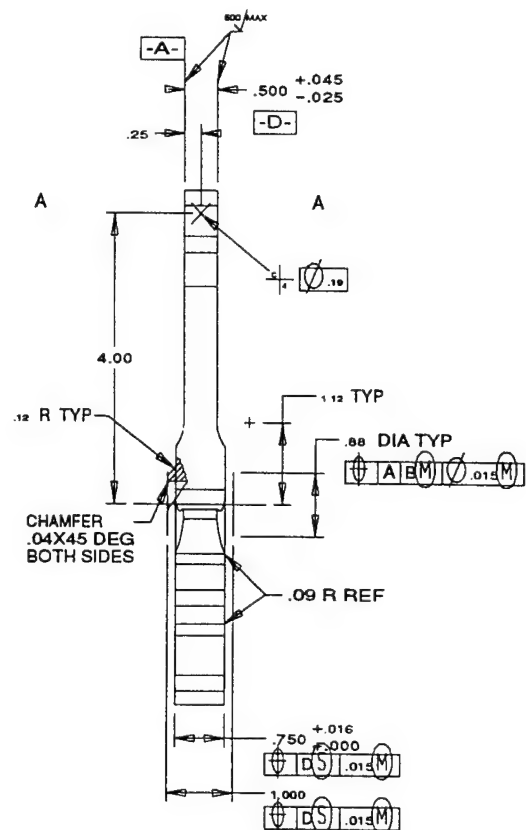


Figure 1-1 IGES Model

[illegible]

The companies and military organizations that will participate in this transfer test along with CAD software and milling machine is shown below. The letter next to the name of the company will be the identifying mark on the part.

## 1.4 IGES Transfer Test

Table 1-1 CALS IGES TRANSFER PARTICIPANTS

Letter	Company/Organization	Location	CADSoftware	MillingMachine
	Air Force CALS Test Bed	Dayton OH	Cadkey 4.06	
A	Sikorsky Aircraft	Stratford CT	CATIA V3.0R2.3	Mazak H500/50 w/M32 Controller
B	Watervliet Army Arsenal	Watervliet NY	CALMA DDM V6.01	White Sunstrand Vertical Omnimill
C	Naval Engineering Test Establishment	Montreal Canada	Intergraph MicroStation 32 V4.0.4.6	Manual
D	Concurrent Technologies Corp	Johnstown PA	AutoCAD R11	MAHO 600-E
E	Volumatic	Macon GA	CAD	Milling
F	Marine Logistic Support Base	Albany GA	VERSA CAD AutoCAD	EZ CRM II
G	CAMcam Technologies	Winter Springs FL	SURFCAM V3.5	Milltronics Vertical Mach Ctr
H	Cleveland Advanced Manufacturing Program	Cleveland OH	Intergraph EMS v1.6, SmartCam, ProEngineer	Masco 4 Axis
I	Moore Quality Tooling	Centerville OH	Solution 3000 v5.3	Hurco BMX 40 Software 5.0
J	4950th Modification Center	Wright-Patterson AFB OH	Intergraph I/EMS V2.0.1.11, Maxmill V2.0.1.7	Bridgeport Series II/BOSS 8 Control
K	Enginetic	Huber Heights OH	AutoCad R11, SmartCAM v6.0	B+S 1000 TOYDA
L	Sinclair Community College	Dayton OH	AutoCAD R12	Milling
M	Naval Air Warfare Center	Indianapolis IN	Computervision CADD 4X	FAD 6030 or VMC 75
N	Rock Island Army Arsenal	Rock Island IL	Unigraphics V9.0	Cincinnati T20
O	EDS/ Unigraphics	Maryland Heights MO	Unigraphics v9.0	ACRALOC
Q	San Antonio Air Logistics Center	Kelly AFB TX	Computervision CADDS 4X R.6E	Cincinnati 10VC w/ Acramtic 900 Controller
R	Department of Energy, Sandia National Laboratories	Albuquerque NM	Anvil 5000 R11 Rev2	Monarch VMC 75 3-Axis Mill
S	Ogden Air Logistics Center	Hill AFB UT	Computervision 4X R7.0	Milling
T	Sacramento Air Logistics Center	McClellan AFB CA	CATIA	Cincinnati 15V
U	SEACOSD	Vallejo CA	CAD	Milling
W	Naval Air Warfare Center	China Lake CA	Graftek GMS v2.6	Mazak V7.5/ GMS Mazatrol

# IGES TRANSFER TEST MANUFACTURING LOCATIONS

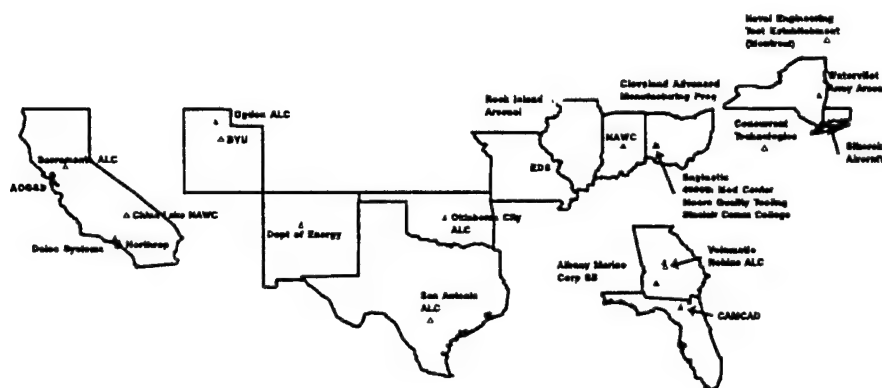


Figure 1-3 Map Showing IGES Participant Locations

## 1.5 Document Transfer Test

The CALS document transfer test will be the first multiple system test of CALS data. Testing to date has involved at most, two different systems. This test will involve multiple systems in two countries. Each company will use its CALS publishing system to read the document and make the required modifications. The modifications will consist of one or two paragraphs and graphic images if desired and adding the software used in the table below. The paragraphs will relate to a humorous story that was started at the AFCTB.

## 1.6 How This Document Was Created

This document was created on a PC using Enable 4.5 word processor. No tagging was done during this initial creation. The resulting document was saved in a UNIX ASCII format and sent to a SUN SPARC station 2 where SoftQuad's Author/Editor was used for tagging. The generic MIL-D-38784B DTD was used with the exception of commented out sections were removed and the external ISO character sets were commented out. A minor change was made to the ITEM tag to permit the use of WARNING and CAUTION tags. Only part of the tables were tagged at this time.

The resulting tagged document was moved back to a PC and Enable 4.5 was used to complete the tagging of the tables using a block copy procedure. The document was parsed using both the Exoterica XGML Normalizer and DataLogic ParseStation with no reported errors. The document was read into Enable

4.5 and saved in a UNIX ASCII format and moved back to the SUN SPARC Station.

All graphics images with the exception of the sample Tech Order page were created on a PC. The two maps were created using Software Publishers (SPC) Harvard GeoGraphics and saved as CGM files. These were then read into HarvardGraphics 3.0 and modified. The modified files were then saved as CGM files. The seal on the cover was created from three files created on Harvard Graphics3.0. These were grouped together and saved as one file.

The sample Tech Order pages were scanned in from an available T.O. in the Air Force CALS Test Bed. The included pages do not relate to the part but are included as part of the entire demonstration. The raster images were converted from the scanned TIFF files to CALS raster using Inset Systems HiJaak. The converted files were then converted to IslandPaint format and cropped and cleaned up. The text from the sample T.O. was typed in the document using ArborText Adept.

An IGES file showing the hook was converted and read into Rosetta Technologies Preview. The image was rotated and saved as a CALS raster image. This file was then returned to the PC where it was read into Inset Systems HiJaak 2.0 and converted into an IMG format for a test of XEROX's Ventura Publisher. The image was reconverted using HiJaak to a CALS format. This is the file used in the document. The IGES file contained a 3-D model which is not permitted in a type 1 CALS IGES file. The file was converted on the SUN SPARC

using ArborText Adept iges2draw converter. The resulting file is included in the document.

All parts of the document were brought together using ArborText Adept and published. The parts were written to a nine-track tape using the CTN Tapetool 1.2.8.

The above information is provided for information. The number and types of software used is presented to show that CALS can move across platforms and software. No endorsement is implied with any of the named software products.

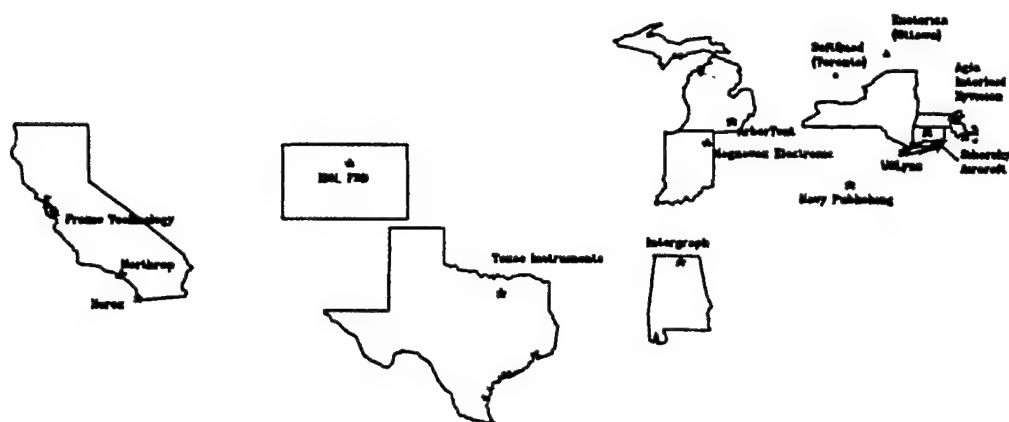
The companies and organizations involved in this test are shown in Table 1-2. Each participant will update the table reflecting the software used during the test.

Table 1-2 CALS SGML TRANSFER PARTICIPANTS

Company/Organization	Location	PublishingSystem
Air Force CALS Test Bed	WPAFB OH	Enable 4.5
		SoftQuad A/E 2.3
		Exotorica XGMLNormalizer
		ArborText Adept
		Harvard Graphics 3.05
		Harvard GeoGraphics 1.0
		Rosetta Technologies Preview
		Inset Systems HiJaak 2.03
		Cadkey 4.06
		Island Graphics IslandDraw/Paint
		CTN Tapetool 1.2.8
USLynx	853 Broadway, New York, NY 10003 212-673-3210	1840A Tape Handler
		XyWrite III and Context-Wise AutoTagger
		CALS Instance Imager for 486 to validate and convert to Ventura
		HP III Printer
Sikorsky Aircraft	Stratford CT	Xyvision
Navy Publication	Washington DC	XXXXXXXXXXXX
Interleaf	Waltham MA	Interleaf CALS Application
Xyvision	Wakefield MA	XyVision Parlance Publisher
SoftQuad	Toronto Canada	SoftQuad AE 2.1
Exoterica	Ottawa Canada	XXXXXXXXXXXX
Arbortext	Ann Arbor MI	Adept 5.0
Magnavox Electronic Corp	Fort Wayne IN	XXXXXXXXXXXX
Datalogics	Chicago IL	WriterStation
Intergraph	Huntsville AL	Intergraph xxxx
Texas Instruments	Plano TX	
Boeing Defense Space	Wichita KS	

Company/Organization	Location	PublishingSystem
IBM, FSD	Boulder CO	
Northwest Industries LTD	Edmonton Alberta, Canada	
SM-ALC/TIM	Sacramento CA	
Frame Technology	San Jose CA	XXXXXXXXXXXX
WordPerfect		
Northrop Corporation	Pica Rivera CA	XXXXXXXXXXXX
Xerox	San Diego CA	XEROX xxxxxxxx

## CALS EXPO SGML TRANSFER TEST





## 1.7 Notes by Document Transfer Participants

This is the location for optional notes about the transfer test. Any notes inserted here will be public and available to media at the end of the test.

**1.7.1 US Lynx Inc.** US Lynx would like to note that the FOSI supplied was not a CALS template but a proprietary version with certain values different from the template FOSIs in 28001A and 28001B. The page sets have different column widths, and the headers and footers are all flush right instead of quadded out, for instance. This FOSI structure is based on the unreleased (and still evolving) FOSI in 28001B and includes FOSI elements such as "algroup" whose use is yet to be documented by the FOSI committee.

Because there are specifications missing from that FOSI, US Lynx elected to use, where necessary, default values specified in the 38784B standard. Tables, for instance, are inadequately specified in the supplied FOSI. And since the defaulted format values and the "serif" face we use as a default caused our pages to set differently, we elected to do some manual style intervention, such as ignoring the "pgrk" tag when it didn't make visual sense. We also elected to change the column values for Table 1-1 from those specified in the instance. The updates to the table added much longer material to columns four and five, which caused deep turnovers at the colwidth values given in the instance; by increasing the width of those columns (and shortening the other three columns) we achieved fewer turnover lines. We did not change the values in the instance (they are on the tape the next participant will receive).

We note that the FOSI calls for the use of external file entities for "Warning" and "Caution" heads, but these files are not exchanged via the tape. We defaulted to our standard style.

An aesthetic note: we sent two style versions of the hard copy. One follows the supplied FOSI insofar as the spec's in it were not ambiguous. The second is a style we consider closer to 38784B, using bold paragraph titles rather than underlined titles. We prefer this solution since ruling is still a little ambiguous (and changing) in the FOSI and since the underlines are always set too close to the type, especially when set with tight leading. We feel the bold titles are cleaner, more professional looking and can be supported on virtually all printers these days.

Graphic placements specified in the instance text were used as a rough guide only. The tables were enough longer and the proximity of these long tables to the graphics were such that the specifications for vertical placement could not be honored. In addition, the attribute "graphsty" is used in the instance, which should link to a value in the FOSI of "graphstyl." However no such attribute with the value "300" is included in the FOSI. Because of some ambiguity in the 28001A and B standard, we don't understand the attributes for "reprodep" and "reprowid" (lin x lin) given for the IGES graphic.

The same graphic conversion routine could not handle both the IGESMAP and SGMLMAP CGM files (we note that the CGM files are specified in the instance's "boardno" attribute this time rather than the G4 files as last October). So we tried a conversion to PGL for the IGESMAP, and an issue became

apparent regarding mapping of vector format fonts on HP PCL and PostScript printers. For the formal hard-copy version we substituted the G4 files supplied with the tape for both maps, rather than use the CGM files.

As we reported in October's test, our Datalogics parser reported that the supplied instance had an error warning; the parser did not accept having a processing instruction after the "/doc" tag. Also as reported last October the DTD could not be automatically processed as supplied on the tape. The proper doctype start was commented out and there was also no end bracket. US Lynx had to amend the DTD by hand in order to parse the DTD. Also the text file referenced a different DTD than the DTD delivered on the tape and that declaration had to be removed to parse the document. US Lynx thinks we need to have a uniform convention for delivering DTDs, preferably one with viable DTDs as read off the tape. In the future there will be environments that are essentially "hang and print" and thus the DTD should parse as it comes off the tape.

**1.7.2 Interleaf, Inc** Record ends are inconsistently handled in the material we received. The original material presumes that record ends are spaces. The material from USLynx puts in all significant spaces and puts record ends at safe places, as does Interleaf. We have attempted to rectify the words that otherwise are run together.

The graphic attributes are inadequate to size the graphics in the document. As indicated above, incorrect graphsty="300" appear, not in the FOSI sample that was supplied. We resolved the graphic sizing by hand. Incorrect reference to system entities for the graphics accompanying WARNING and CAUTION occur. We ignored them, and used our own, synthesized without requiring those entities. In fact, the DTD does not expect a graphic reference to identify the appropriate graphic associated with those tags, nor are such graphic tags present.

We used the DTD supplied, rather than the more nearly current revision 1 DTD of the same name. The supplied DTD has the warning and caution as inclusions on item. The revised DTD didn't, causing a parsing error where the warning and caution were placed. As noted in the initial commentary, this was a deliberate variation in the DTD. One of the expectations we had for CALS was that receiving systems could depend on a DTD in the absence of a workable FOSI, so that pre-designed presentations for elements in their context could be used. By arbitrarily altering the DTD supplied with a particular delivery, this may not be a valid assumption.

The received graphic HOOK1.IGS reported the error "Unknown record type S". That file was unusable. A subsequent substitution of another copy received by email had different problems.

There is a reference to a graphic entity called wire that is not present in the material we received, even though it is referenced in a graphic attribute: boardno="wire".

The subpara1 titles from USLynx have periods explicitly included at the ends. Those periods are not to propagate to the contents, so by our interpretation are not part of the title, and are to be supplied by the system. Support for this

interpretation is that the old-style underscored titles of 38784B do not underscore the period following that title. When our presentation system supplies such periods, we get doubled periods.

The printed sample of has less wireframe segments visible than when we rendered it. For example, a vertical should join the rightmost two corners.

The entries by U.S.Lynx contain tab characters, which have no system-neutral, context-free interpretation, other than that of the SGML Declaration as a function SEPCAR role.

The archaic typewriter convention of "two spaces after terminal punctuation" does occur, and should be avoided.

**1.7.3 ArborText, Inc** ArborText used the Adept Portability Package to read and import the contents of the CALS Test Network tape. ArborText found an error in the tape image file "d001q007" during the import process. The file "d001q007" contains the IGES file "hook1.igs" and its CALS header information. The ArborText filters found that records 3 and 4 of the header were 81 characters in length, one more than the maximum as defined by Section 5.2.1.5 in MIL-STD-1840A. The ArborText filters ignored the extra character in each of these records and successfully created the graphic.

The CTN DTD parses successfully without errors. However, the ArborText parser displayed warnings about the quantity assigned to "LITLEN". In order to parse this DTD without warnings, the value of LITLEN should be set to 1363. That value exceeds the reference concrete syntax default of 240. The CALS Test Network tape did not include an SGML declaration. In order to resolve the warning messages, we modified the DTD and included the SGML declaration found in MIL-M-28001B, Appendix A, Section 30.7. After including the SGML declaration, the DTD parsed successfully without errors or warnings. The LITLEN value in the CALS SGML declaration is 2048.

As mentioned in the section of this document titled "How This Document Was Created", we found the external ISO character sets were commented out. We also found that the entities mdash, rdquor and dash had been included in the document instance. Therefore, the entities used in the document instance displayed the message "entities were used but not declared". We decided to remove the comment around the ISO character sets in the DTD. This enabled the entities in the document instance to be resolved.

The document instance contained several graphic entity declarations. ArborText found the notation in the entity declaration for "seal.cgm" was declared as "FAX" when, in fact, the graphic is a CGM graphic. We changed the notation in the document instance from "FAX" to "CGM".

We found the graphics attributes were not properly set, resulting in graphics with incorrect scaling. ArborText modified the graphics attributes to fit within the constraints of the page.

ArborText points out that the FOSI contained references to nonexistent DTD tags used for electronic review. These references appear as warnings to the user. They are not errors.. ArborText reviewed the DTD for the appropriate tags and found they did not exist in the DTD. ArborText subsequently removed those items in the FOSI that pertain to electronic review as their DTD counter parts no longer exist. The warnings no longer appear.

Interleaf has a good point that subparal titles should not have explicit periods following the title because it affects the style (note the leaders in the table of contents). Interleaf asserts periods "...are not part of the title, and are to be supplied by the system." Interleaf explains that explicit periods after the subparal title result in double periods in the Interleaf presentation system. ArborText reviewed the FOSI, which is our formatting guide, and the CTN FOSI does NOT specify that the formatted instance should have a period at the end of the subparal title. Therefore, Interleaf's system is either not using the CTN FOSI or their system is incorrectly formatting the document.

ArborText understands that 8879's handling of records, record ends, and spaces creates a lot of practical problems. However, we believe that most users don't appreciate having their SGML files made human-unreadable by introducing line breaks in what can only be called odd (albeit "safe") places. Furthermore interpreting significant records ends in mixed content and #PCDATA to be semantically equivalent to spaces unless the FOSI has indicated otherwise (via a Quadding category's Quad characteristic value of "asis") is a reasonable and user-friendly thing for an SGML editor to do. Therefore, our product produces an SGML file with significant record ends introduced into #PCDATA at reasonable intervals producing lines of approximately 75 to 80 characters in length, but with an option to allow lines up to any length if the user wishes to avoid the introduction of significant records ends.

#### 1.7.4 Notes by Next Participant

## CHAPTER 2

### Sample Page - Tech Order

#### 2.1 Sample Tech Order

TO 2J-F110-16-6  
WP 003 00

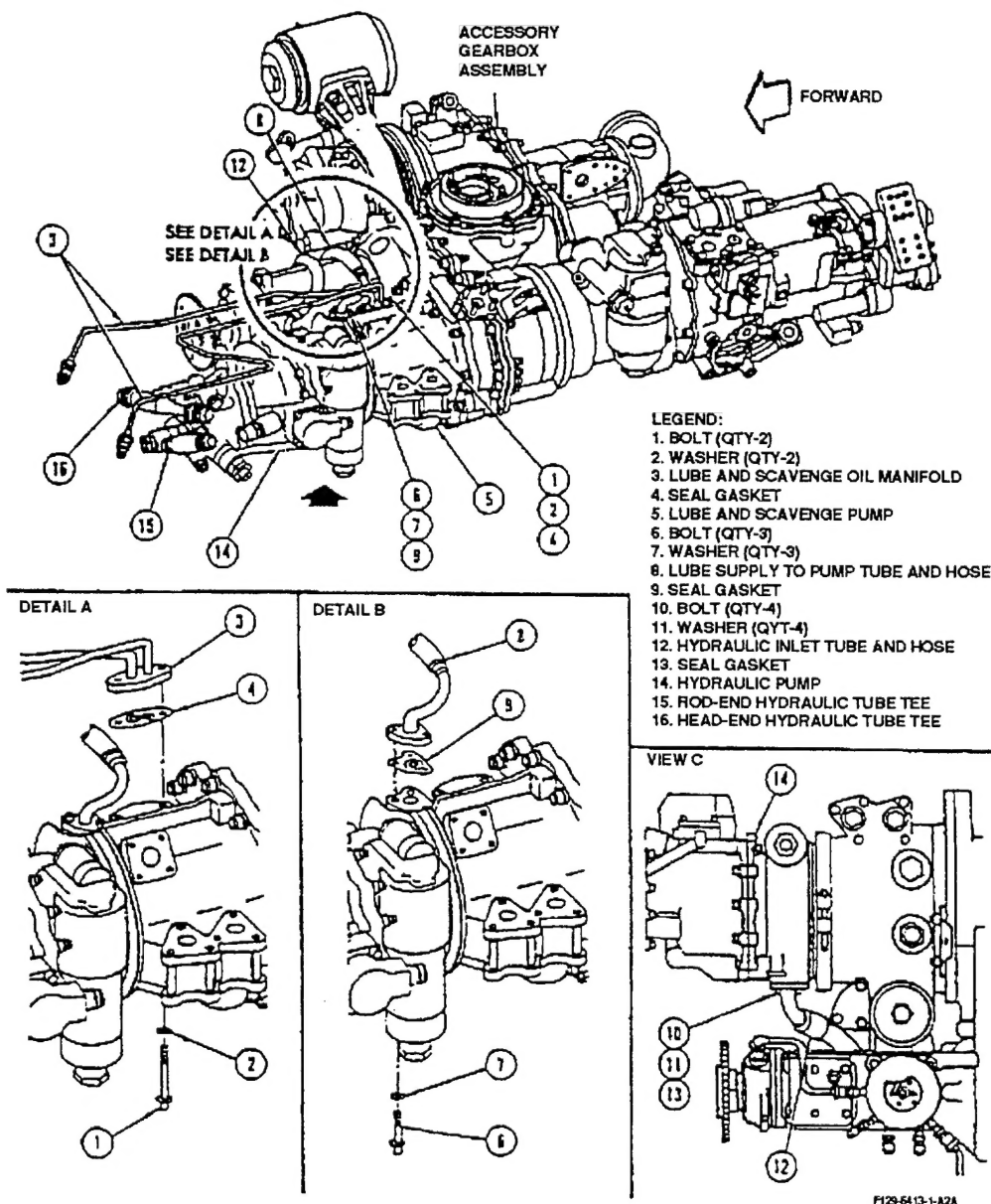


Figure 2-5 Manifold, Lube Tube and Hose, and Hydraulic Tube and Hose Removal

a. Remove boost pump seal drain fuel tube as follows (figure 2):

(1) Cut and remove safety wire from coupling nuts on both ends of boost pump seal drain fuel tube.

### WARNING

Fuel, MIL-T-5624, is flammable and toxic to skin, eyes, and respiratory tract. Skin and eye protection is required. Avoid repeated or prolonged contact. Use in a well-ventilated area.

### CAUTION

When disconnecting tubing, use two wrenches to avoid overstressing. Use one wrench to hold mating tube connector and the other wrench to loosen attaching tube coupling nut.

(2) Disconnect coupling nuts from both ends of boost pump seal drain tube at boost pump and aft main drain manifold. Remove boost pump seal drain fuel tube.

(3) Cover ends of boost pump seal drain fuel tube, ports of boost pump, and ports of manifold with plastic bags, PPP-B-26, or other suitable covers.

b. Remove AC generator (TO 2J-F110-16-3, WP 005 00).

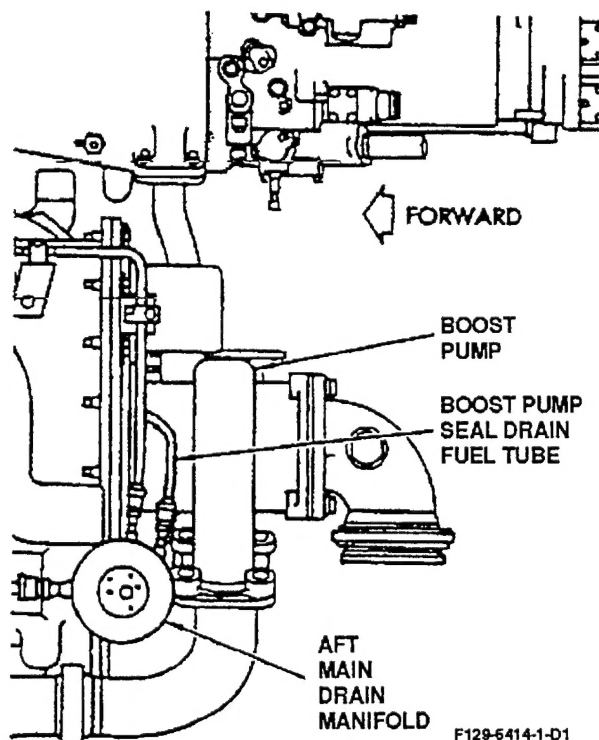


Figure 2-6 Boost Pump Seal Drain Fuel Tube Removal

## CHAPTER 3

### The SGML Transfer Story

#### 3.1 Part One - The Start

It was a dark and rainy night. Edna sat in front of her computer terminal, lines of care etched into her young, care-worn face. Knowing full well, even as she began to enter her confession into the IWSDB, that she would be subject to questions from higher authority, maybe even the MAISRC. She crouched over her care-worn keyboard and started to enter her tale. She had agonized long and hard before making this decision, fearing the wrath of the CALS ISG committee on The Suppression of Overblown Phrases. Finally she began to type the name(s) of the guilty person(s). Just as she was about to run a spell check on the list(s) of government(s) agencies a shadow appeared from over her shoulder, blanking out the blanked-out portion of the screen and she knew that the guilty person(s), or significant other(s), was about to stop her from continuing her expose, or at least preventing her from saving it to the B drive. She emitted a high-pitched scream and then, after being bound and gagged and her password removed, she started to tell her amazing story to her captor(s).

Each company/organization will add one or two paragraphs to the story. Graphics may be added but the total contribution is not to exceed one page. Change the title to reflect the name of your company/organization and continue the story.

#### 3.2 Part Two - Edna Begins Her Story, By US Lynx

"Last fall there were persistent rumors about a shadowy SGML initiative code-named PEDS. No one was sure who was sponsoring the research, but a 'Deep Throat' kind of character called me one day to say that the system was undergoing a trial during a hot congressional race in Washington state. He said I could find out more about PEDS, which 'Throat' said stood for Political Exaggeration Detection and Sampling system, during an environmental rally in the Cascades. I thought I had to be there.

"Tempers were high at the rally, because a "Wise Use" pro-clearcutting group had shown up. As I was fighting my way through the screaming crowd, I saw a mousy woman suddenly appear as if from nowhere. The crowd parted to let her pass, a few "Wise Users" snickering, the environmentalists watching in awe. My God, it was the Log Lady!

"And she was cradling not a real branch, but a compressed sawdust fireplace log, like the ones city folks buy for their very expensive fireplaces. Trailing behind the Log Lady was a faint aura, at the edge of which I thought I saw the sweep of an ermine cape.

"She came straight to me and looked searchingly into my eyes. 'I sense you work for the government. Let me tell you what's been happening since the Twin Peaks crew left me in the woods with that owl,' she began. I asked, 'Does it involve that nebulous shape standing behind your shoulder?' 'You must be psychic,' she whispered with rising excitement. 'Two weeks ago, in the woods, I was visited by an apparition of Elvis, and he hasn't left me alone since then.' Ba-ba-booeey!

"A sudden rush of wind trembled the trees. I couldn't suppress a shiver. For the past few months reports had come to my office of dead Elvises appearing to cows throughout the Midwest and upsetting their milk production by crooning 'Love Me Tender' for hours. And here was another Elvis. Ba-ba-booeey!!!

"The Log Lady lowered her voice conspiratorially and told me that Elvis had been warning her about a little man with big ears from Texas and his sidekick Yimbo. (I knew that Yimbo and he reminded me less of Tonto than Gomer.) 'He has something to do with what Elvis calls PEDS or PEZ - some kind of electronic response system - and has a DDT or DTD that he's fiddling with.' But there her information ended. The rally seemed to go on forever and not even when Willie Nelson gave us a ten-song set did anyone else approach me. I felt frustrated, night had fallen, and I told the Log Lady I needed to leave. She (and Elvis) wanted a ride down the road. Back at my rented 4X4 Log Lady and Elvis had a brief scuffle over who got to sit in front; Log Lady won.

"Her (their) motel was positively Batesian. Log Lady didn't take to brief goodbyes, and I guess my impatience was showing because suddenly she seemed to melt into mist before my eyes. I blinked but she was really gone. And Elvis? Sitting in the dark back seat grinning a little. He said, 'Just a sample of virtual reality projection with a psychological kicker added; you wanted to see her.' And he too began to fade, until all one saw was that famous Cheshire cat grin (the stamp!). Oh Elvis, you cyber-chunk, I thought.

"I was about to speed away, but I noticed something glowing on Elvis's seat. I picked it up and saw it was a cassette labeled 'Unpublished Beatles Songs.' Was this Elvis' secret taste in music or did this unpublished Beatles song hide a secret about the PEDS project, like 'Revolution Number Nine' played backward? Why was Elvis appearing all over the country and why was he projecting out the Log Lady, with her warnings about the dwarf from Dallas? What did this dwarf know about the secret PEDS project and who was running it? Questions and more questions. For answers, I leaned forward to push the tape into the player. Something hit me from behind and I blacked out."

#### 3.3 Part Three - Blood, Blood, and more...Blood, by Data Conversion Laboratory

I came to slowly, dried blood sticking my eyeballs to the steering wheel. I pulled back slowly, my vision was a bit foggy, but I could make out the huge blood stain on the cassette player, the seat cushion, and the still semi-viscous blood puddle on the dash.

Blood dripped from the already-coming-loose-again-ceiling fabric, and it dripped from the door handles and window buttons, and it felt wet and dry, and wet and dry on my stomach where my blood soaked crew-neck shirt blew back and forth in the slight breeze.



My first thoughts were, is this my blood? Where did I get all this blood? I don't recall having that much blood. And if not my blood, whose?

As my vision started clearing up, I began to notice something strange. The blood stain on the seat cushion had formed what appeared to be a numeric string. Two of the digits were hard to make out, but as the blood dried, it became obvious to me that the number 38784 appeared on the seat. Still partially dazed, I thought to myself that I'd seen that number before, but couldn't remember where or when. But deep in my gut I knew that this was the key that would help me answer my continually growing list of questions.

#### 3.4 PART FOUR — MEANING IN "38784", BY INTER-LEAF

38784 — is it a mystical pattern of digits, or a holistic grouping? Is there meaning revealed in the image appearing after all that blood?

What is the meaning of the patterns in the digits? left middle right: thrice seven times four is 84, just how 38784 concludes. That repetition and redundancy could well be a checking scheme to make sure that no information is lost in presentation. Now we have left the interiors: more repetition, both eights. A common financial reporting system uses fractions of eights. Could that be shorthand for 3/8 and 7/8? Perhaps that reappearing of the eights is symbolic of Elvis's reported reappearing? Or In even times: The product of the evens, eight times eight times four is 128. That's America's Technological Highway in Massachusetts. Isn't that a natural linkage? The Log Lady appears here as well using those even digits log base four of 8 times 8 is 3. Isn't that odd? Speaking of odd, the sum of the odd three plus seven is ten, whose prime factors complete the primes up to ten: 3 7 2 5. How many primes are there there: just four, another use of that last digit. How many Elvises are there? The most telling is the double reversal of direction: first reversal (about the 7) is 48783. Then 48783 minus 38784 is 9999. The second reversal of 9999 about their horizontal middle gives 6666. Four sixes again reversing the first and last digits of 38784 is just three sixes. Everyone knows that that 666 is code for the devil, just as the devil is lived reversed. I note that the blood darkens, and where the 38784 had formed, now a hole appears.

I now explore that dark hole. Perhaps the meaning of that darkening and disappearing of the 38784 is holistic. The insight from the numerology suggest some vision, some interpretation, some structure, some formalities. Perhaps there is a combination of visual information, extensive narrative information to generalize what just shakes out of those visuals, and some formalisms that try to make "still clearer" those visions through what seem to be never-ending "Fantastic Odes Suggesting Indiscretions", or FOSIs for short. There is need for an unlimited number of Elvises to forever come up with new variations by just shake, rattle, and rolling through the

unending records of FOSIs. I must find where that dark hole called 38784 actually is. so I can again approach an Elvis. I wonder which one? I wonder how many odes can come from one Elvis?

#### 3.5 Part FIVE - Possessed by ELVIS

"Honey, wake up," echoed the distant voice in my head. Hands tugging at my nightshirt. "You're having that nightmare again", the voice said louder! Protesting loudly, grunting and finally groping for the Mickey Mouse watch on my bed stand, I find the lamp switch and Mickey at the same time. The glow of light paralyzes my eyes as I struggle to sit up. Glancing at Mickey, horror seizes me. In an instant, i blink and the image of Mickey with sideburns in a white polyester bell bottom jump suit vanishes. It's 1:50 a.m. "Whew, it was just a dream" I say out loud partly to myself and partly to the already-snoring lump next to me. Stepping into my tattered bunny slippers and pulling on my "Barney" bathrobe, I turn off the light and thumper silently down the stairs, through the living room toward the den.

The den is lit by the white static of the TV, casting out radiant bursts of light in all directions. The room is silent except for the tic-toc of the clock on the far wall. In the corner, hidden in the darkness, shadows dance on the newest addition to the family: the ELectronic Vesatile Imaging System (ELVIS) and it's subsystem, the Optical Display Editing System (ODES).

My pulse quickens as I cross the room. Perspiration forms at my temples. My hands feel clammy. "Welcome to ELVIS!" says the device as it comes to life at my command. Cautiously, I sit. ELVIS' subsystems come on-line one at a time. ELVIS instructs, "For Optical interaction, lift and attach the ODES headset." Trembling, I put on the headset and the monitor shuts down, the keyboard vanishes into the darkness. I lookup into the pulsating rainbow in front of my eyes and realize I've been transformed into another place, possibly another time. Visions from my past flash before my eyes. I think "STOP" and an image freezes before my eyes. I think "I wish it would move slowly", and it does. Images from my life appear in a seemingly random pattern, each evoking the same emotions as when the event originally happened, only stronger, more intense. Reliving each experience is far more difficult now.

Tired with the past, I ask myself "what about the future?" The buffet of imagery vanishes. "Noooooooo", I scream, but they're gone instantly. Gone is the headset. ELVIS is missing. So are the ODES. I cradle my head in my hands. As my hands meet my face, I stand and face the horrid image in the mirror. I crumble, falling to my knees. Sobbing, I realize those sideburns are mine. So is the white polyester bell-bottom jump suit and the platform shoes!

#### 3.6 Part Six

Continue the saga here if you dare